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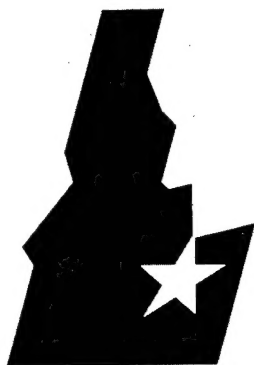
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January 1992



**Idaho
National
Engineering
Laboratory**

*Managed
by the U.S.
Department
of Energy*

SUPPLEMENTAL DATA IN SUPPORT OF BICARBONATE OF SODA STRIPPING

PHASE I (Vol 2)

**M. D. Argyle
J. E. Findley
K. L. Gering
T. L. Harris
L. A. Polson
K. J. Poor
M. N. Tsang**



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SUPPLEMENTAL DATA IN SUPPORT OF
BICARBONATE OF SODA STRIPPING
PHASE I

FRESH SODIUM BICARBONATE PAINT-STRIPPING MEDIA
TITRATION GRAPHS AND DATA

The data in this supplemental document is to support the Bicarbonate of Soda Stripping - Phase I report. This data was used to calculate the titration endpoints for the fresh and spent sodium bicarbonate paint-stripping media. This information was used to determine 1) how much acid would be needed to neutralize the spent media and 2) the amount of carbonate and bicarbonate in the fresh and spent media samples.

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TABLE 1. STANDARDIZATION OF NaOH WITH KHP.

<u>ml 0.3753M KHP</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.00	13.704	0.50	0.08	0.25	0.15
1.00	13.780	1.50	0.02	1.00	-0.05
2.00	13.803	2.50	-0.00	2.00	-0.03
3.00	13.799	3.60	-0.01	3.05	-0.01
4.20	13.787	4.60	-0.01	4.10	0.00
5.00	13.780	5.50	-0.01	5.05	-0.00
6.00	13.767	6.50	-0.01	6.00	-0.00
7.00	13.754	7.50	-0.01	7.00	-0.00
8.00	13.740	8.50	-0.02	8.00	-0.01
9.00	13.719	9.50	-0.02	9.00	0.00
10.00	13.703	10.50	-0.02	10.00	-0.01
11.00	13.679	11.50	-0.03	11.00	-0.00
12.00	13.652	12.50	-0.03	12.00	-0.01
13.00	13.617	13.50	-0.03	13.00	0.01
14.00	13.588	14.50	-0.05	14.00	-0.02
15.00	13.535	15.50	-0.04	15.00	0.02
16.00	13.498	16.50	-0.04	16.00	-0.00
17.00	13.458	17.50	-0.06	17.00	-0.02
18.00	13.403	18.50	-0.05	18.00	0.00
19.00	13.350	19.50	-0.07	19.00	-0.02
20.00	13.278	20.50	-0.09	20.00	-0.02
21.00	13.186	21.25	-0.08	20.88	0.01
21.50	13.145	21.75	-0.13	21.50	-0.09
22.00	13.081	22.25	-0.16	22.00	-0.07
22.50	13.000	22.75	-0.11	22.50	0.10
23.00	12.945	23.25	-0.22	23.00	-0.22
23.50	12.836	23.65	-0.25	23.45	-0.09
23.80	12.760	23.90	-0.22	23.78	0.11
24.00	12.715	24.10	-0.30	24.00	-0.38
24.20	12.655	24.28	-0.35	24.19	-0.27
24.35	12.603	24.38	-0.94	24.33	-5.93
24.40	12.556	24.45	-0.43	24.41	6.80
24.50	12.513	24.55	-0.45	24.50	-0.20
24.60	12.468	24.65	-0.59	24.60	-1.40
24.70	12.409	24.75	-0.30	24.70	2.90
24.80	12.379	24.85	-0.43	24.80	-1.30
24.90	12.336	24.95	-0.43	24.90	0.00
25.00	12.293	25.05	-0.60	25.00	-1.70
25.10	12.233	25.15	-1.05	25.10	-4.50
25.20	12.128	25.25	-0.70	25.20	3.50
25.30	12.058	25.35	-0.94	25.30	-2.40
25.40	11.964	25.45	-1.70	25.40	-7.60
25.50	11.794	25.55	-2.15	25.50	-4.50
25.60	11.579	25.65	-3.73	25.60	-15.80
25.70	11.206	25.75	-6.86	25.70	-31.30
25.80	10.520	25.83	-28.52	25.79	-288.80
25.85	9.094	25.88	-14.66	25.85	277.20

TABLE 1. STANDARDIZATION OF NaOH WITH KHP (continued).

<u>ml 0.3753M KHP</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d²(pH)/d(ml)²</u>
25.90	8.361	25.93	-7.72	25.90	138.80
25.95	7.975	25.98	-4.90	25.95	56.40
26.00	7.730	26.05	-2.56	26.01	31.20
26.10	7.474	26.15	-2.04	26.10	5.20
26.20	7.270	26.25	-1.48	26.20	5.60
26.30	7.122	26.35	-0.91	26.30	5.70
26.40	7.031	26.50	-0.88	26.43	0.17
26.60	6.854	26.70	-0.67	26.60	1.07
26.80	6.720	26.90	-0.70	26.80	-0.15
27.00	6.580	27.10	-0.47	27.00	1.12
27.20	6.485	27.30	-0.37	27.20	0.52
27.40	6.411	27.50	-0.36	27.40	0.05
27.60	6.339	27.70	-0.33	27.60	0.17
27.80	6.274	27.90	-0.33	27.80	-0.02
28.00	6.208	28.25	-0.24	28.08	0.25
28.50	6.087	28.75	-0.20	28.50	0.09
29.00	5.989	29.25	-0.24	29.00	-0.09
29.50	5.868	29.75	-0.10	29.50	0.28
30.00	5.816	30.50	-0.08	30.13	0.03
31.00	5.732	31.50	-0.08	31.00	0.00
32.00	5.651	32.50	-0.06	32.00	0.02
33.00	5.592	33.50	-0.06	33.00	-0.00
34.00	5.529	34.50	-0.05	34.00	0.01
35.00	5.475	17.50	0.16	26.00	-0.01

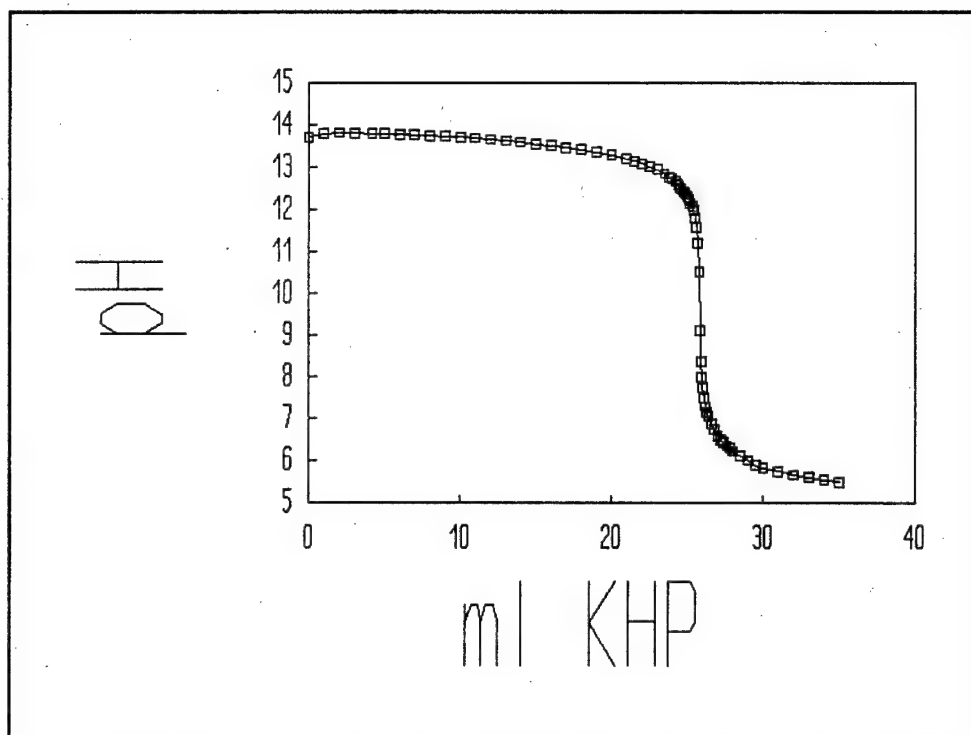


Figure C-1. Titration Curve For Standardization Of NaOH With 0.3753 M KHP.

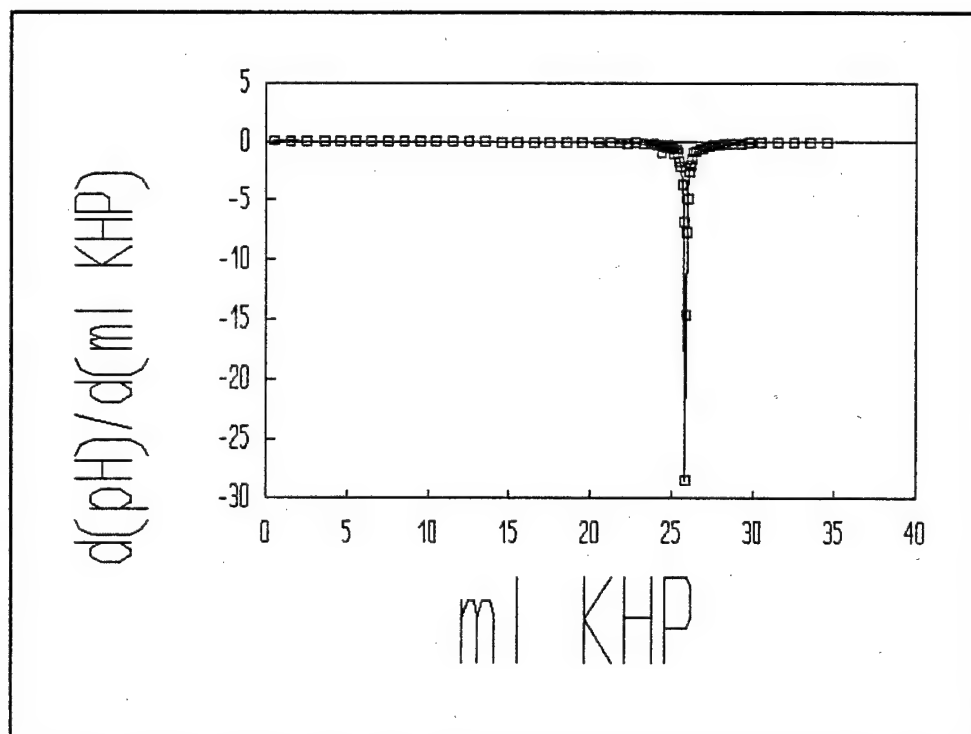


Figure C-2. First Derivative Of The Titration Curve For Standardization Of NaOH With 0.3753 M KHP.

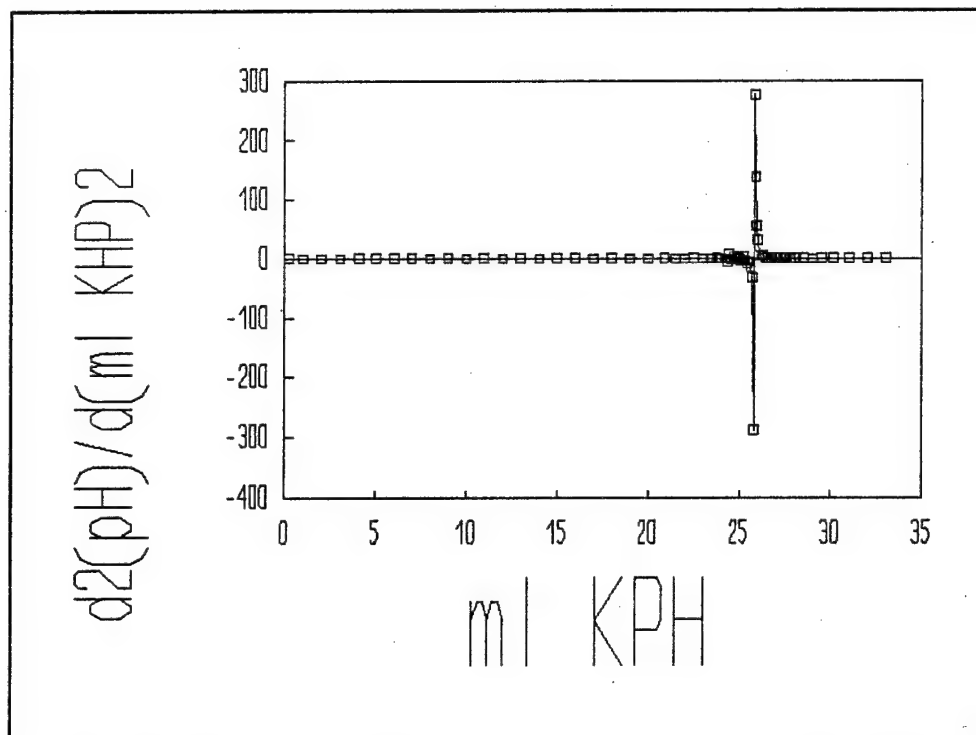


Figure C-3. Second Derivative Of The Titration Curve For Standardization Of NaOH With 0.3753 M KHP.

TABLE 2. STANDARDIZATION OF HCL WITH NaOH - FIRST BATCH.

<u>ml 0.969M NaOH</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d²(pH)/d(ml)²</u>
0.00	0.509	0.50	-0.06	0.25	-0.12
1.00	0.449	1.50	0.00	1.00	0.07
2.00	0.454	2.50	0.01	2.00	0.00
3.00	0.462	3.50	0.01	3.00	0.01
4.00	0.476	4.50	0.02	4.00	0.00
5.00	0.491	5.50	0.02	5.00	0.00
6.00	0.507	6.50	0.02	6.00	0.00
7.00	0.523	7.50	0.03	7.00	0.01
8.00	0.549	8.50	0.02	8.00	-0.00
9.00	0.571	9.50	0.03	9.00	0.01
10.00	0.600	10.50	0.04	10.00	0.01
11.00	0.636	11.50	0.04	11.00	0.00
12.00	0.674	12.50	0.05	12.00	0.01
13.00	0.721	13.50	0.06	13.00	0.01
14.00	0.778	14.50	0.07	14.00	0.01
15.00	0.845	15.50	0.11	15.00	0.04
16.00	0.952	16.50	0.11	16.00	0.00
17.00	1.063	17.10	0.21	16.80	0.16
17.20	1.105	17.30	0.18	17.20	-0.17
17.40	1.140	17.60	0.15	17.45	-0.08
17.80	1.200	17.90	0.21	17.75	0.22
18.00	1.243	18.10	0.22	18.00	0.03
18.20	1.287	18.35	0.24	18.23	0.08
18.50	1.359	18.60	0.22	18.48	-0.08
18.70	1.403	18.85	0.31	18.73	0.36
19.00	1.496	19.10	0.40	18.98	0.36
19.20	1.576	19.35	0.43	19.23	0.13
19.50	1.706	19.65	0.59	19.50	0.51
19.80	1.882	19.90	1.18	19.78	2.37
20.00	2.118	20.05	2.06	19.97	5.87
20.10	2.324	20.15	3.07	20.10	10.10
20.20	2.631	20.25	15.10	20.20	120.30
20.30	4.141	20.33	129.74	20.29	1528.53
20.35	10.628	20.38	10.14	20.35	-2392.00
20.40	11.135	20.42	4.32	20.40	-116.40
20.45	11.351	20.48	3.02	20.45	-26.00
20.50	11.502	20.53	2.18	20.50	-16.80
20.55	11.611	20.58	1.68	20.55	-10.00
20.60	11.695	20.63	1.42	20.60	-5.20
20.65	11.766	20.68	1.06	20.65	-7.20
20.70	11.819	20.80	0.49	20.74	-4.60
20.90	11.916	20.95	0.96	20.88	3.17
21.00	12.012	21.25	0.46	21.10	-1.65
21.50	12.244	21.75	0.26	21.50	-0.40
22.00	12.376	22.25	0.19	22.00	-0.14
22.50	12.473	22.75	0.13	22.50	-0.12
23.00	12.539	23.50	0.09	23.13	-0.05
24.00	12.630	12.00	0.53	17.75	-0.04

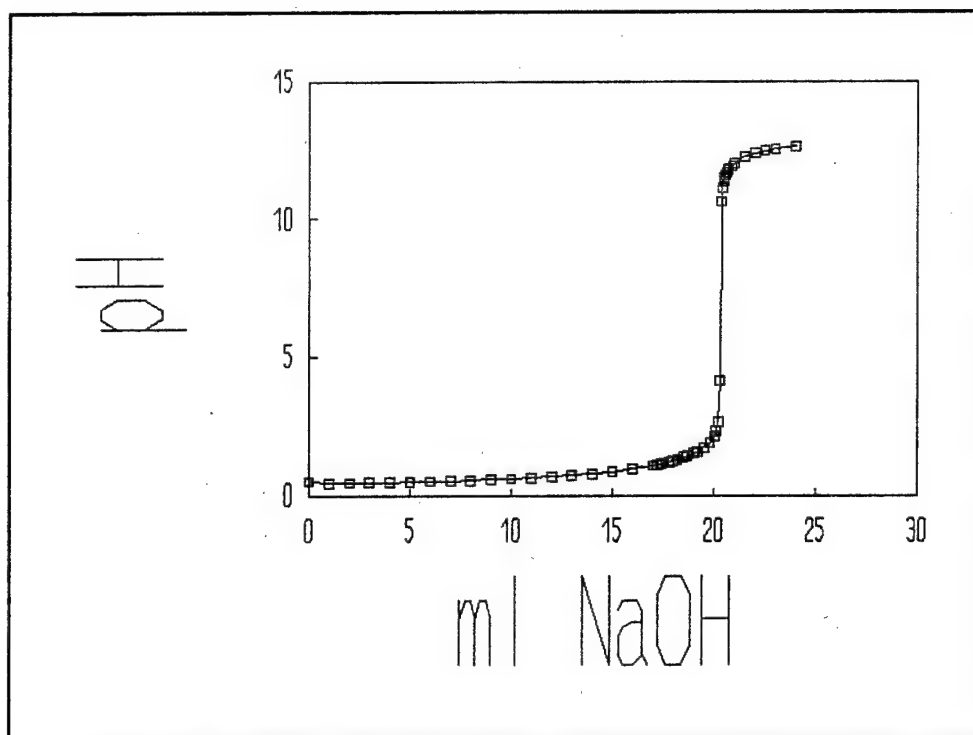


Figure C-4. Titration Curve For The Standardization Of The First Batch Of HCl With 0.969 M NaOH.

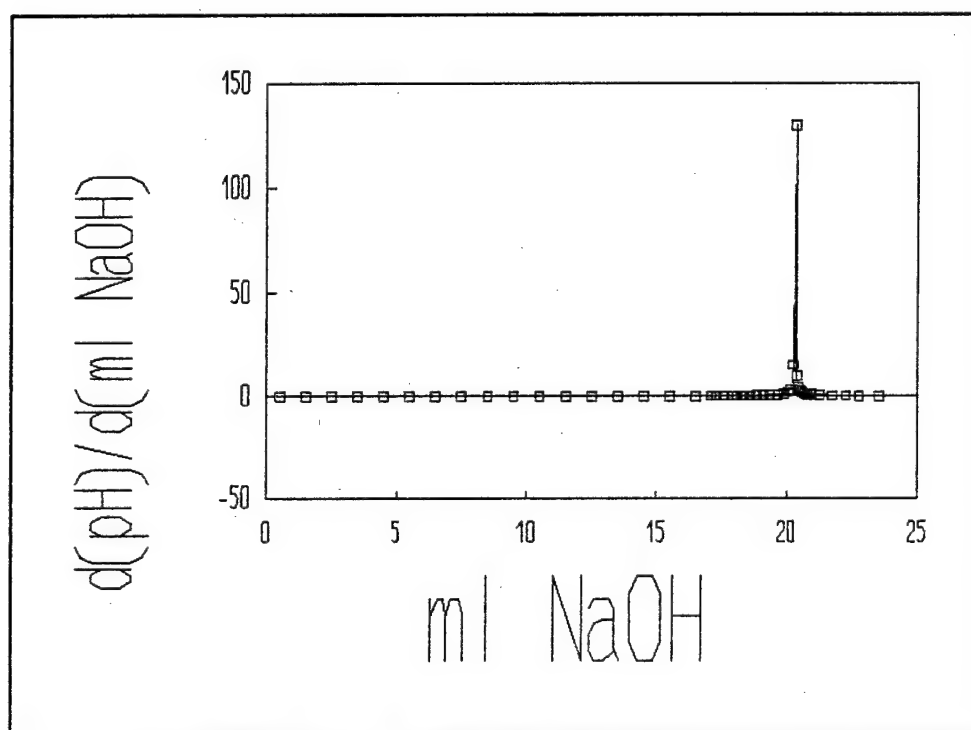


Figure C-5. First Derivative Of The Titration Curve For The Standardization Of The First Batch Of HCl With 0.969 M NaOH.

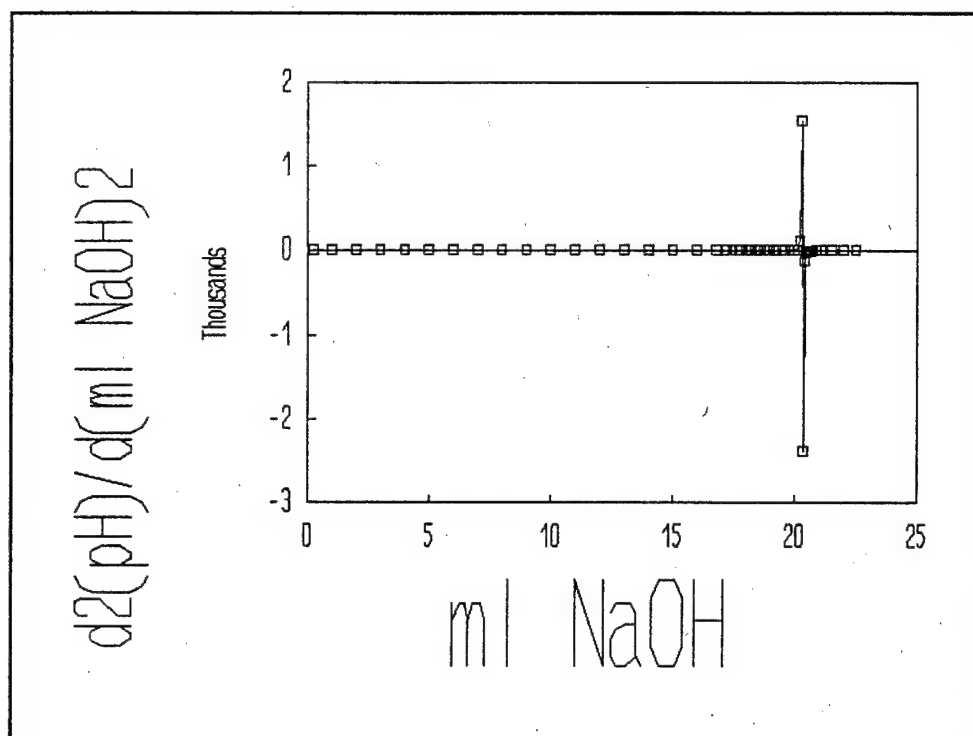


Figure C-6. Second Derivative Of The Titration Curve For The Standardization Of The First Batch Of HCl With 0.969 M NaOH.

TABLE 3. STANDARDIZATION OF HCL WITH NaOH - SECOND BATCH.

<u>ml 0.969M NaOH</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	0.681	0.50	-0.10	0.25	-0.19
1.0	0.584	1.50	-0.01	1.00	0.09
2.0	0.577	2.50	-0.01	2.00	-0.00
3.0	0.565	3.50	-0.00	3.00	0.01
4.0	0.562	4.50	0.01	4.00	0.02
5.0	0.575	5.50	0.03	5.00	0.01
6.0	0.602	6.50	0.01	6.00	-0.02
7.0	0.611	7.50	0.03	7.00	0.03
8.0	0.645	8.50	0.01	8.00	-0.03
9.0	0.653	9.50	0.03	9.00	0.02
10.0	0.682	10.50	0.01	10.00	-0.02
11.0	0.694	11.50	0.05	11.00	0.04
12.0	0.745	13.00	0.04	12.25	-0.01
14.0	0.820	15.00	0.07	14.00	0.02
16.0	0.969	16.50	0.14	15.75	0.05
17.0	1.111	17.50	0.17	17.00	0.03
18.0	1.284	18.25	0.39	17.88	0.29
18.5	1.478	18.75	0.27	18.50	-0.24
19.0	1.612	19.25	0.45	19.00	0.36
19.5	1.835	19.75	1.03	19.50	1.16
20.0	2.348	20.05	2.56	19.90	5.11
20.1	2.604	20.15	5.28	20.10	27.20
20.2	3.132	20.25	74.19	20.20	689.10
20.3	10.551	20.35	7.75	20.30	-664.40
20.4	11.326	20.45	2.58	20.40	-51.70
20.5	11.584	20.75	1.17	20.60	-4.70
21.0	12.169	21.50	0.32	21.13	-1.13
22.0	12.493	22.50	0.18	22.00	-0.15
23.0	12.668	23.50	0.09	23.00	-0.09
24.0	12.754	24.50	0.07	24.00	-0.02
25.0	12.822	12.50	0.51	18.50	-0.04

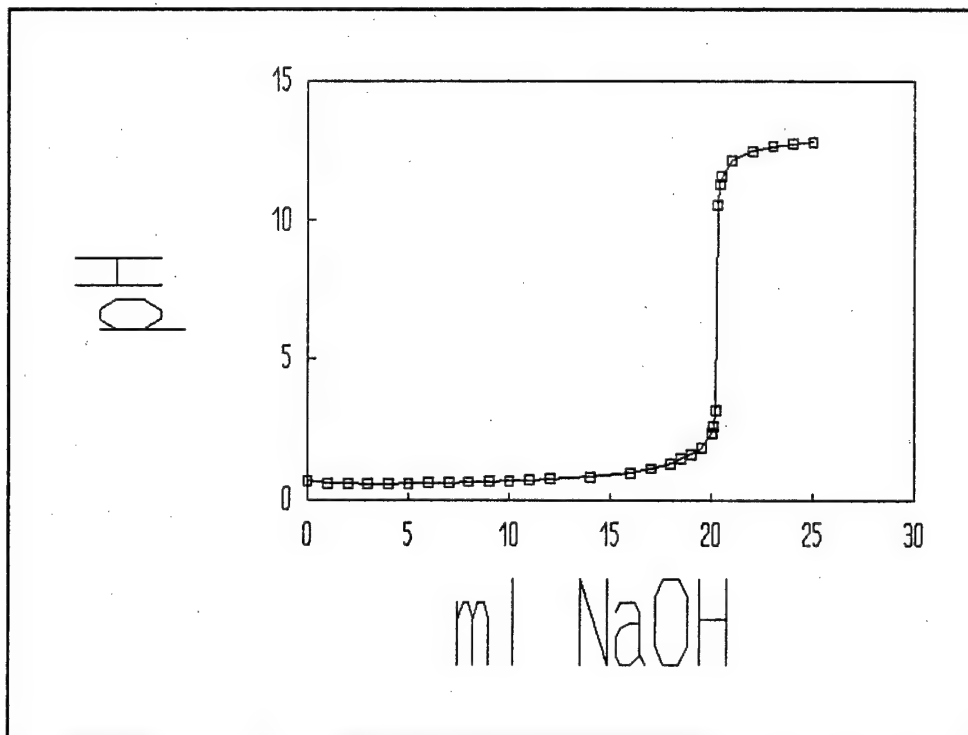


Figure C-7. Titration Curve For The Standardization Of The Second Batch Of HCl With 0.969 M NaOH.

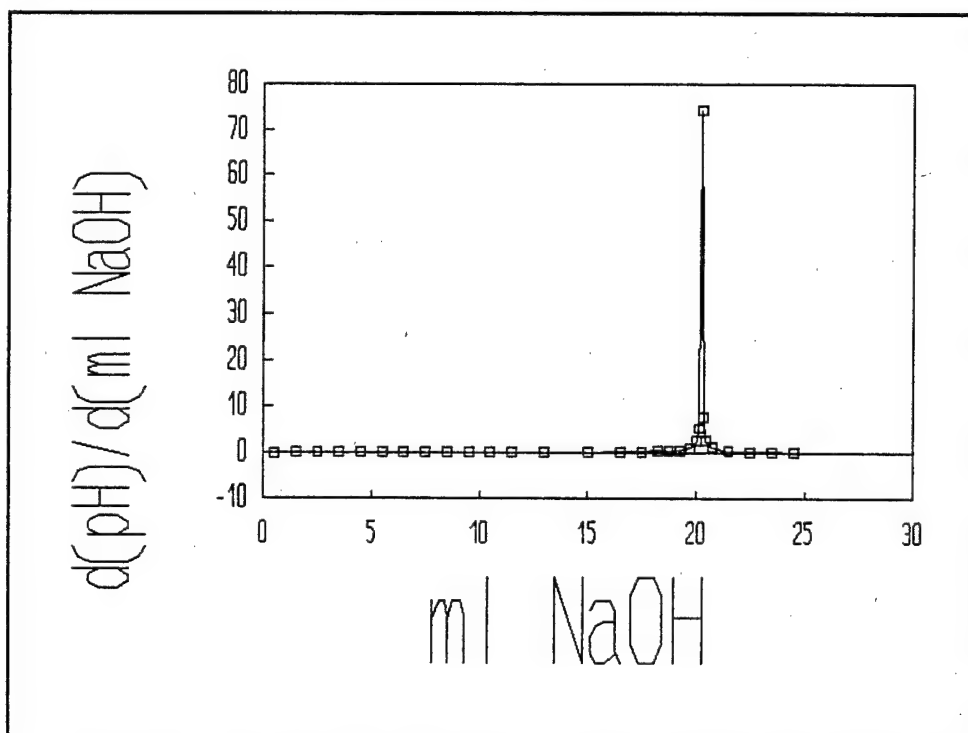


Figure C-8. First Derivative Of The Titration Curve For The Standardization Of The Second Batch Of HCl With 0.969 M NaOH.

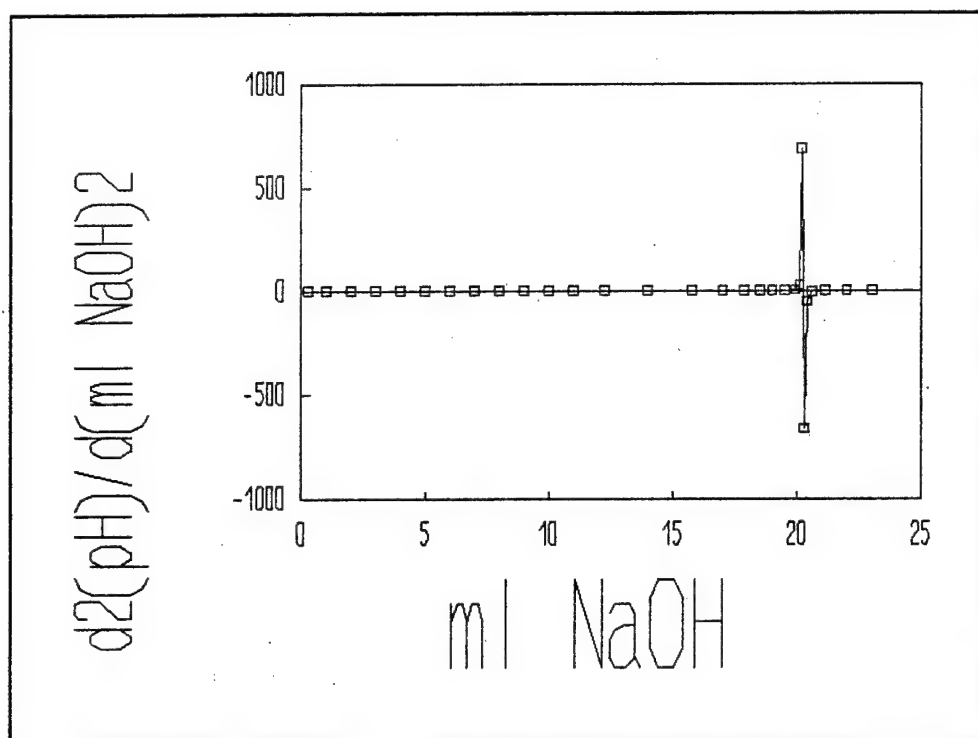


Figure C-9. Second Derivative Of The Titration Curve For The Standardization Of The Second Batch Of HCl With 0.969 M NaOH.

TABLE 4. STANDARDIZATION OF HCL WITH NaOH - THIRD BATCH.

<u>ml 0.969M NaOH</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	0.825	0.50	-0.15	0.25	-0.31
1.0	0.671	1.50	-0.01	1.00	0.15
2.0	0.663	2.50	0.01	2.00	0.01
3.0	0.669	3.50	0.01	3.00	0.00
4.0	0.679	4.50	0.00	4.00	-0.01
5.0	0.681	5.50	0.02	5.00	0.01
6.0	0.697	6.50	0.02	6.00	0.00
7.0	0.716	7.50	0.02	7.00	0.00
8.0	0.736	8.50	0.02	8.00	0.00
9.0	0.758	9.50	0.03	9.00	0.00
10.0	0.785	10.50	0.03	10.00	0.01
11.0	0.819	11.50	0.03	11.00	0.00
12.0	0.854	12.50	0.05	12.00	0.01
13.0	0.901	13.50	0.06	13.00	0.01
14.0	0.958	14.50	0.06	14.00	0.00
15.0	1.020	15.50	0.08	15.00	0.02
16.0	1.101	16.50	0.11	16.00	0.03
17.0	1.212	17.50	0.16	17.00	0.05
18.0	1.376	18.50	0.27	18.00	0.11
19.0	1.648	19.50	7.32	19.00	7.04
20.0	8.964	20.10	9.12	19.80	3.01
20.2	10.788	20.25	3.83	20.17	-35.27
20.3	11.171	20.35	1.95	20.30	-18.80
20.4	11.366	20.45	2.70	20.40	7.50
20.5	11.636	20.75	0.60	20.60	-7.01
21.0	11.934	21.50	0.26	21.13	-0.45
22.0	12.193	22.50	0.14	22.00	-0.12
23.0	12.331	23.50	0.09	23.00	-0.05
24.0	12.423	24.50	0.06	24.00	-0.03
25.0	12.487	12.50	0.50	18.50	-0.04

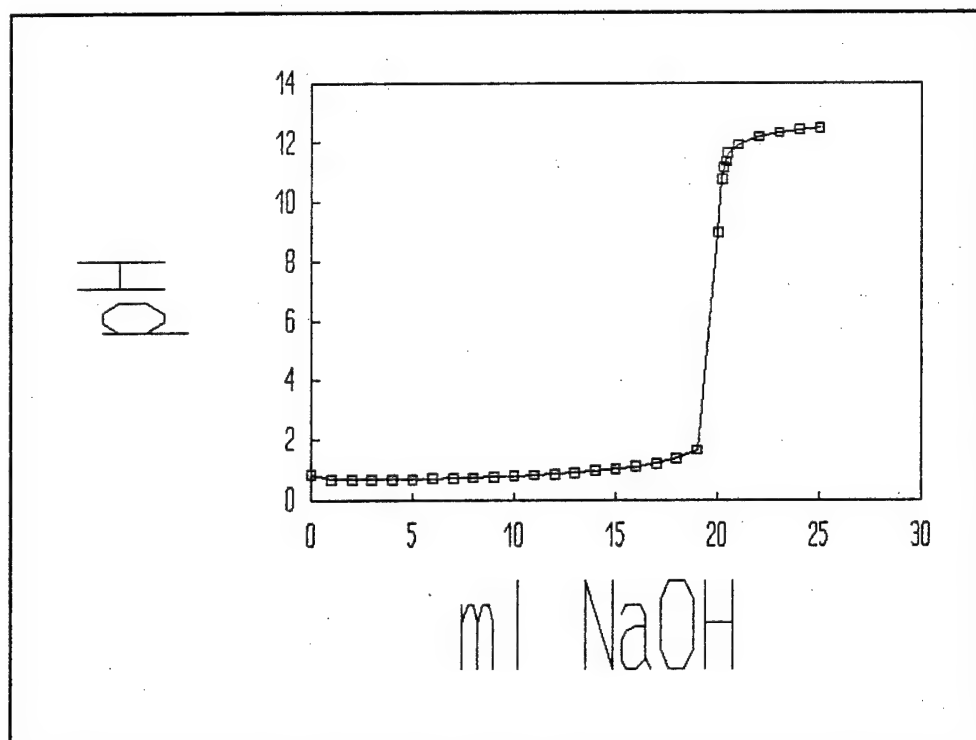


Figure C-10. Titration Curve For The Standardization Of The Third Batch Of HCl With 0.969 M NaOH.

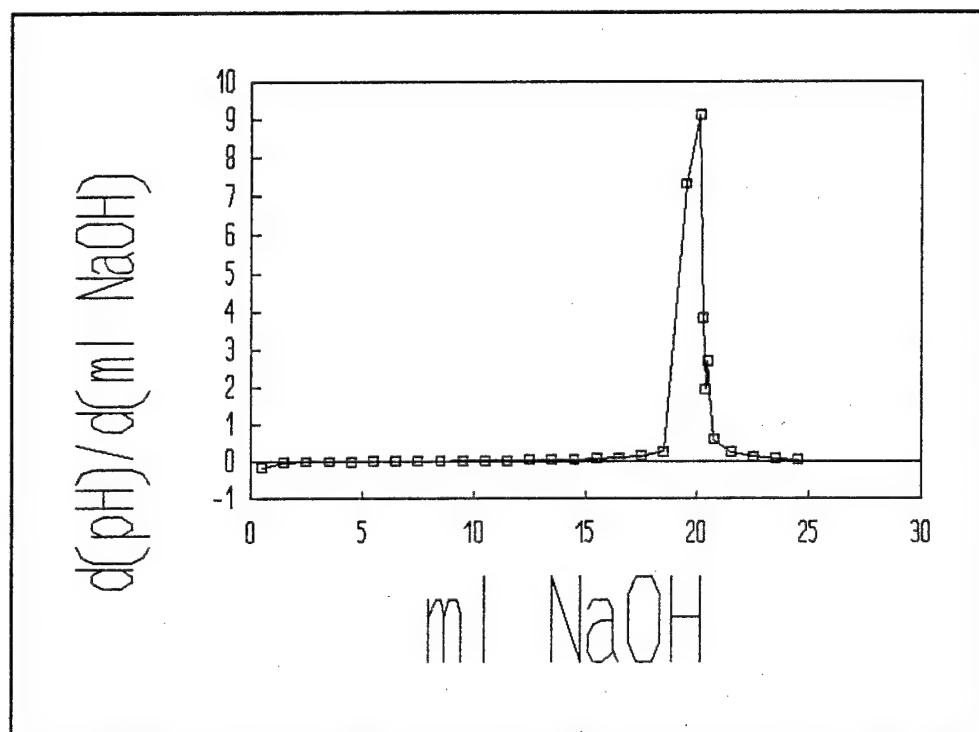


Figure C-11. First Derivative Of The Titration Curve For The Standardization Of The Third Batch Of HCl With 0.969 M NaOH.

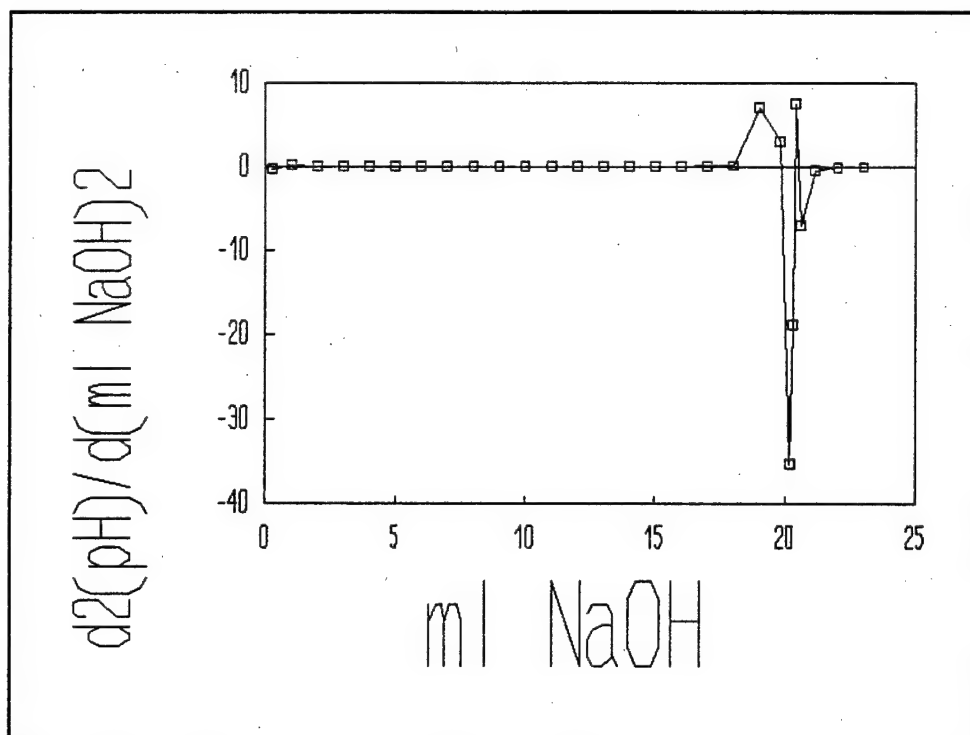


Figure C-12. Second Derivative Of The Titration Curve For The Standardization Of The Third Batch Of HCl With 0.969 M NaOH.

TABLE 5. TOTAL FRESH SODIUM BICARBONATE MEDIA - TITRATION 1.

<u>ml 0.981M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	9.801	0.05	-0.04	1.00	-0.07
1.0	9.764	1.50	-0.11	2.00	-0.02
2.0	9.659	2.50	-0.12	3.00	0.04
3.0	9.537	3.50	-0.08	4.00	-0.09
4.0	9.454	4.50	-0.17	5.00	0.00
5.0	9.286	5.50	-0.17	6.00	-0.14
6.0	9.120	6.50	-0.31	6.88	-0.01
7.0	8.813	7.25	-0.31	7.50	-0.84
7.5	8.657	7.75	-0.73	8.00	-0.18
8.0	8.291	8.25	-0.82	8.50	0.43
8.5	7.879	8.75	-0.61	9.00	0.55
9.0	7.574	9.25	-0.34	9.50	0.10
9.5	7.406	9.75	-0.28	10.13	0.09
10.0	7.264	10.50	-0.21	11.00	0.05
11.0	7.051	11.50	-0.16	12.00	0.04
12.0	6.888	12.50	-0.12	13.00	0.01
13.0	6.768	13.50	-0.11	14.00	0.03
14.0	6.658	14.50	-0.08	15.00	0.02
15.0	6.580	15.50	-0.06	16.00	-0.01
16.0	6.521	16.50	-0.06	17.00	-0.02
17.0	6.457	17.50	-0.08	18.00	0.01
18.0	6.377	18.50	-0.07	19.00	0.03
19.0	6.311	19.50	-0.03	20.00	-0.06
20.0	6.279	20.50	-0.09	21.00	0.12
21.0	6.190	21.50	0.03	22.00	-0.12
22.0	6.216	22.50	-0.10	23.00	-0.01
23.0	6.119	23.50	-0.11	24.00	-0.04
24.0	6.009	24.50	-0.15	24.88	0.14
25.0	5.859	25.25	-0.05	25.50	-0.28
25.5	5.835	25.75	-0.19	26.00	-0.02
26.0	5.742	26.25	-0.20	26.50	0.05
26.5	5.644	26.75	-0.17	27.00	-0.07
27.0	5.559	27.25	-0.20	27.45	-0.70
27.5	5.457	27.65	-0.48	27.78	-0.03
27.8	5.312	27.90	-0.49	28.03	-1.17
28.0	5.214	28.15	-0.78	28.28	-4.03
28.3	4.979	28.40	-1.79	28.50	-13.35
28.5	4.621	28.60	-4.46	28.68	-12.20
28.7	3.729	28.75	-6.29	28.80	35.20
28.8	3.100	28.85	-2.77	28.90	20.20
28.9	2.823	28.95	-0.75	29.10	1.44
29.0	2.748	29.25	-0.32	29.50	-0.62
29.5	2.589	29.75	-0.63	30.00	0.50
30.0	2.276	30.25	-0.38	30.50	-0.08
30.5	2.088	30.75	-0.42	31.13	0.38
31.0	1.880	31.50	-0.13	32.00	0.06
32.0	1.748	32.50	-0.08	33.00	0.01
33.0	1.672	33.50	-0.07	34.00	0.01

TABLE 5. TOTAL FRESH SODIUM BICARBONATE MEDIA - TITRATION 1 (continued).

<u>ml 0.981M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d²(pH)/d(ml)²</u>
34.0	1.602	34.50	-0.06	26.00	-0.01
35.0	1.539	17.50	0.04	8.75	0.00

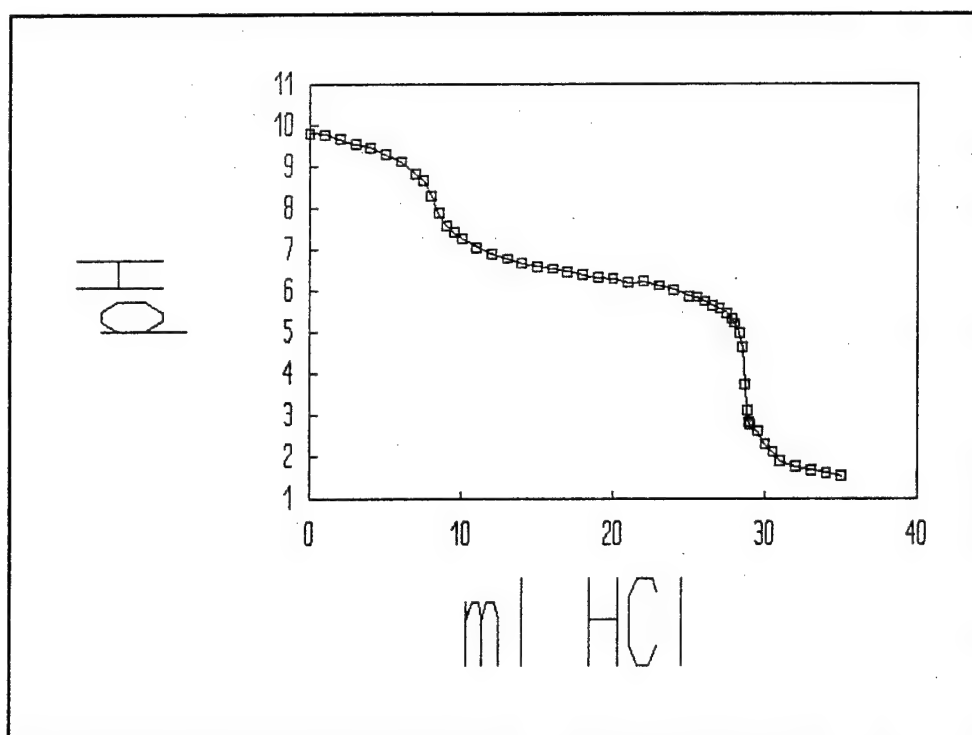


Figure C-13. Curve For The First Titration Of Total Fresh Sodium Bicarbonate Media With 0.981 M HCl.

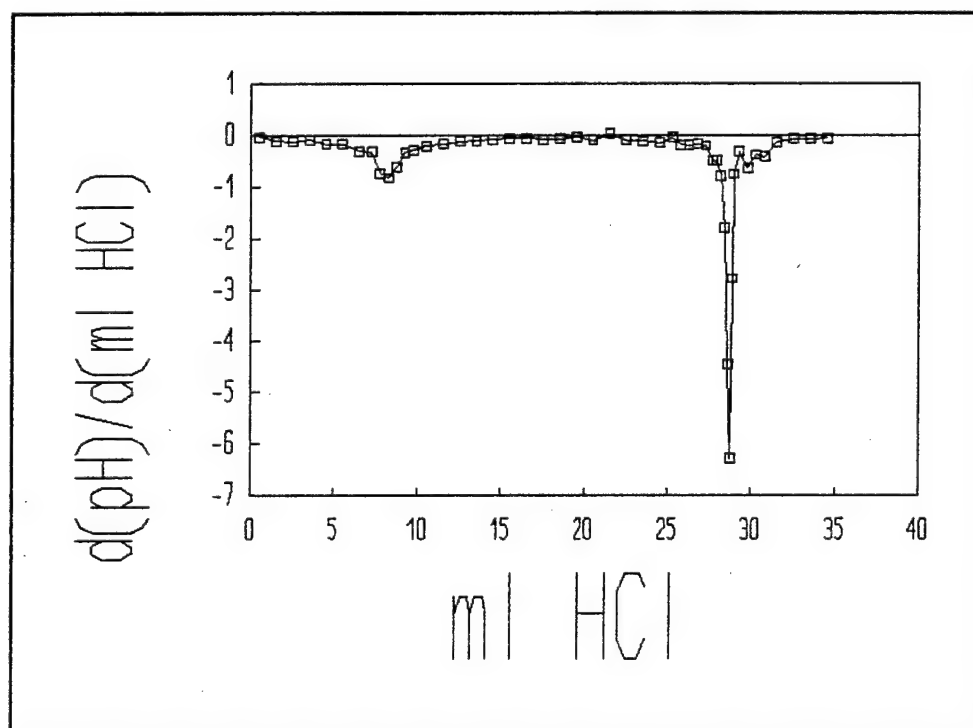


Figure C-14. First Derivative Of The First Titration Curve For Titration Of Total Fresh Sodium Bicarbonate Media With 0.981 M HCl.

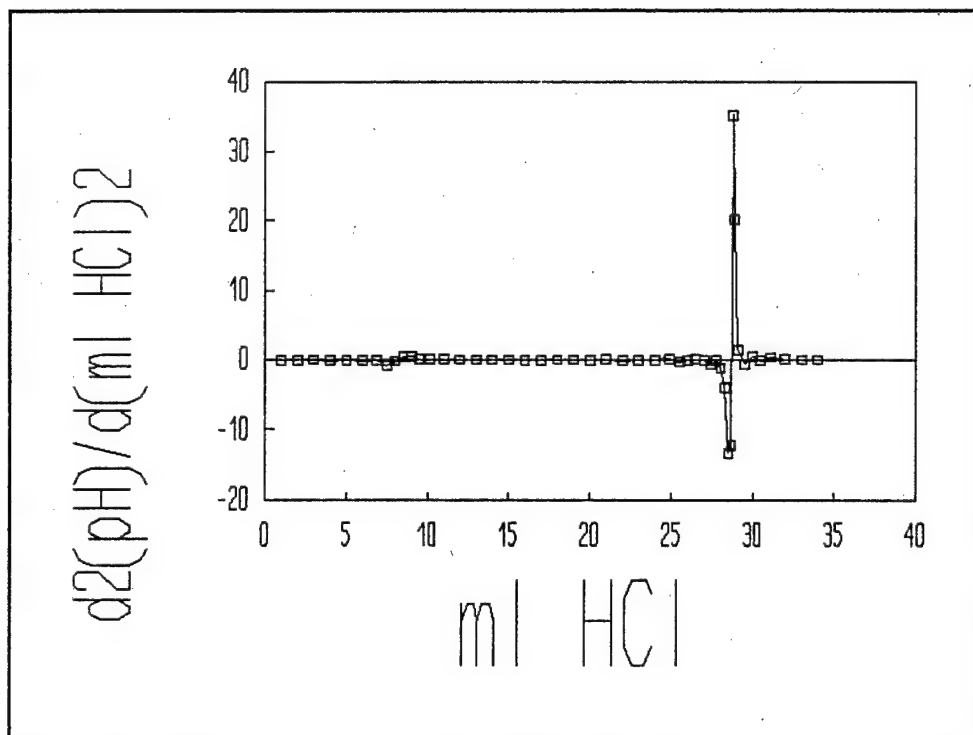


Figure C-15. Second Derivative Of The First Titration Curve For Titration Of Total Fresh Sodium Bicarbonate Media With 0.981 M HCl.

TABLE 6. TOTAL FRESH SODIUM BICARBONATE MEDIA - TITRATION 2.

<u>ml 0.981M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d²(pH)/d(ml)²</u>
0.0	10.049	1.00	-0.15	2.00	0.01
2.0	9.752	3.00	-0.14	4.00	-0.01
4.0	9.480	5.00	-0.15	5.75	-0.01
6.0	9.187	6.50	-0.16	7.00	-0.12
7.0	9.028	7.50	-0.28	7.88	-0.81
8.0	8.750	8.25	-0.88	8.50	0.72
8.5	8.309	8.75	-0.52	9.00	-0.32
9.0	8.049	9.25	-0.68	9.50	0.54
9.5	7.709	9.75	-0.41	10.00	0.80
10.0	7.503	10.25	-0.01	10.50	-0.97
10.5	7.496	10.75	-0.50	11.13	0.40
11.0	7.247	11.50	-0.20	12.25	0.04
12.0	7.048	13.00	-0.14	14.00	0.02
14.0	6.760	15.00	-0.10	16.00	0.01
16.0	6.558	17.00	-0.08	18.00	-0.01
18.0	6.403	19.00	-0.09	20.00	0.00
20.0	6.228	21.00	-0.08	22.00	0.05
22.0	6.067	23.00	0.02	24.00	-0.11
24.0	6.106	25.00	-0.20	25.75	-0.07
26.0	5.713	26.50	-0.31	27.00	-1.89
27.0	5.408	27.50	-2.20	27.88	0.96
28.0	3.210	28.25	-1.48	28.50	1.75
28.5	2.472	28.75	-0.60	29.13	0.47
29.0	2.171	29.50	-0.25	30.25	0.09
30.0	1.920	31.00	-0.11	32.00	0.02
32.0	1.695	33.00	-0.07	33.75	0.01
34.0	1.557	34.50	-0.05	26.00	-0.01
35.0	1.505	17.50	0.04	8.75	0.00

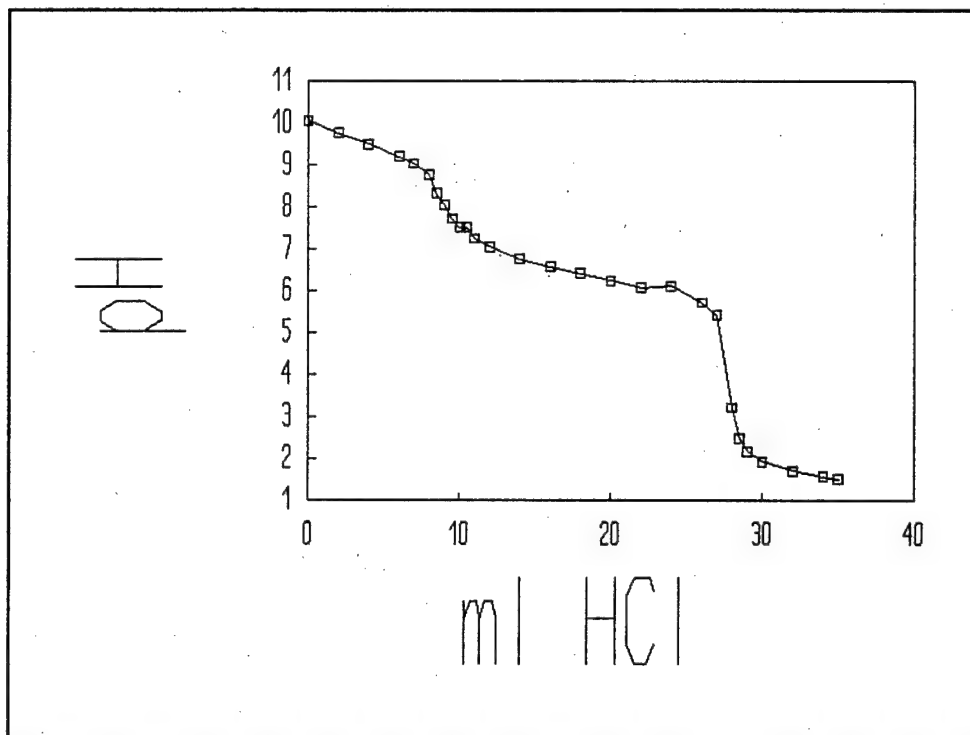


Figure C-16. Curve For The Second Titration Of Total Fresh Sodium Bicarbonate Media With 0.981 M HCl.

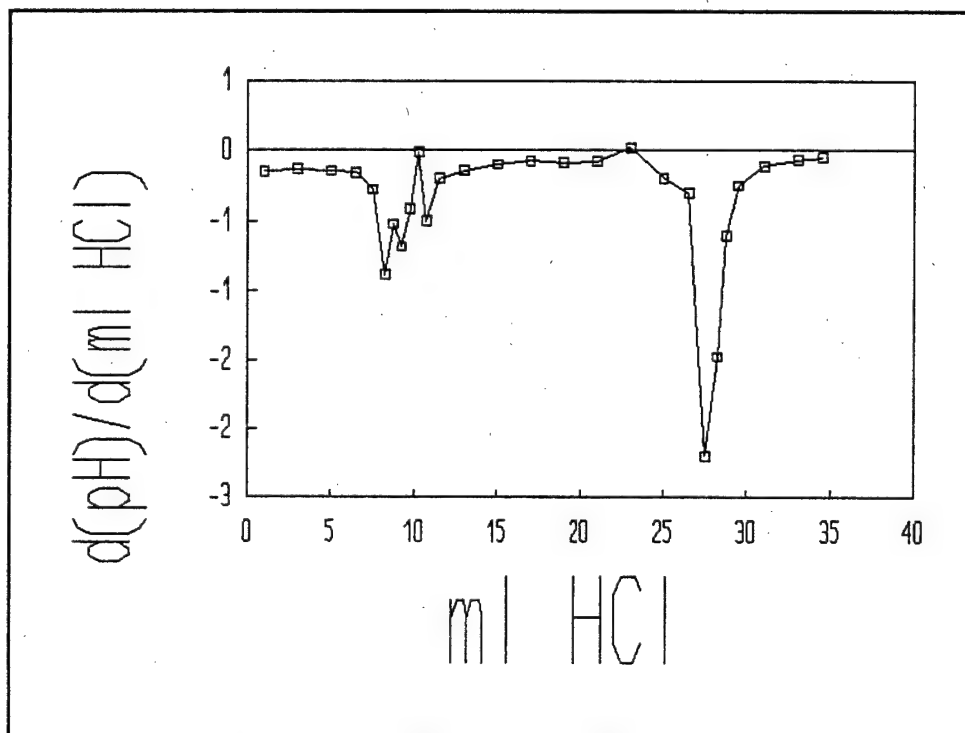


Figure C-17. First Derivative Of The Second Titration Curve For Titration Of Total Fresh Sodium Bicarbonate Media With 0.981 M HCl.

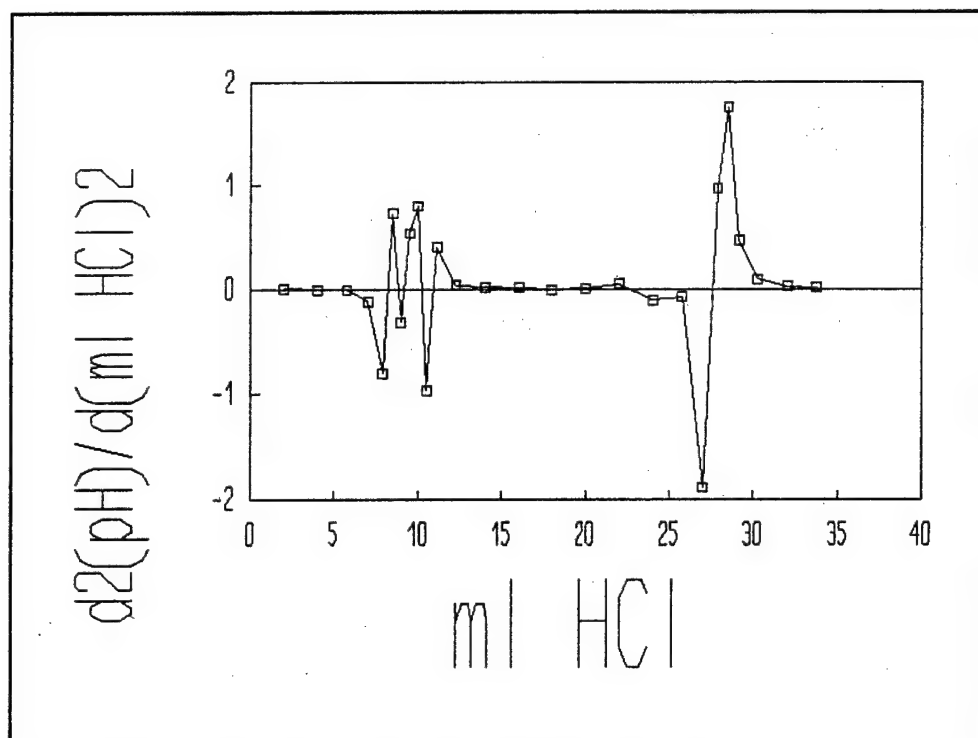


Figure C-18. Second Derivative Of The Second Titration Curve For Titration Of Total Fresh Sodium Bicarbonate Media With 0.981 M HCl.

TABLE 7. TOTAL FRESH SODIUM BICARBONATE MEDIA - TITRATION 3.

<u>ml 0.981M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	10.059	1.00	-0.13	2.00	-0.02
2.0	9.795	3.00	-0.17	4.00	-0.01
4.0	9.458	5.00	-0.18	5.75	-0.07
6.0	9.095	6.50	-0.29	6.88	-0.23
7.0	8.802	7.25	-0.46	7.50	0.18
7.5	8.570	7.75	-0.37	8.00	-0.95
8.0	8.384	8.25	-0.85	8.50	0.59
8.5	7.960	8.75	-0.55	9.00	0.28
9.0	7.684	9.25	-0.41	9.50	0.41
9.5	7.477	9.75	-0.21	10.38	0.00
10.0	7.372	11.00	-0.21	12.00	0.05
12.0	6.953	13.00	-0.11	14.00	0.02
14.0	6.736	15.00	-0.07	16.00	-0.00
16.0	6.598	17.00	-0.07	18.00	-0.00
18.0	6.449	19.00	-0.08	20.00	-0.00
20.0	6.296	21.00	-0.08	22.00	-0.02
22.0	6.135	23.00	-0.11	23.75	-0.00
24.0	5.912	24.50	-0.11	25.00	-0.09
25.0	5.798	25.50	-0.21	26.00	-0.23
26.0	5.590	26.50	-0.43	26.83	-0.08
27.0	5.155	27.15	-0.49	27.28	-3.58
27.3	5.008	27.40	-1.38	27.50	-22.25
27.5	4.731	27.60	-5.83	27.70	10.02
27.7	3.564	27.80	-3.83	27.88	14.47
27.9	2.798	27.95	-1.66	28.05	3.95
28.0	2.632	28.15	-0.87	28.30	1.41
28.3	2.371	28.45	-0.45	28.63	0.23
28.6	2.237	28.80	-0.37	29.15	0.23
29.0	2.090	29.50	-0.21	30.25	0.07
30.0	1.881	31.00	-0.11	32.00	0.02
32.0	1.663	33.00	-0.06	33.75	0.01
34.0	1.541	34.50	-0.05	26.00	-0.01
35.0	1.493	17.50	0.04	8.75	0.00

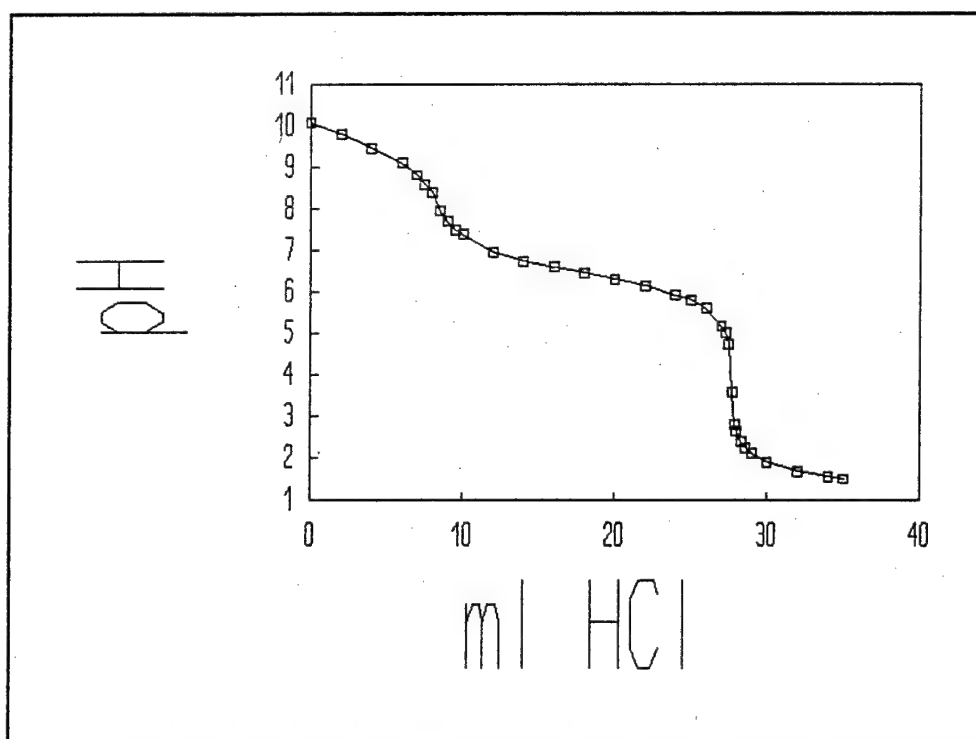


Figure C-19. Curve For The Third Titration Of Total Fresh Sodium Bicarbonate Media With 0.981 M HCl.

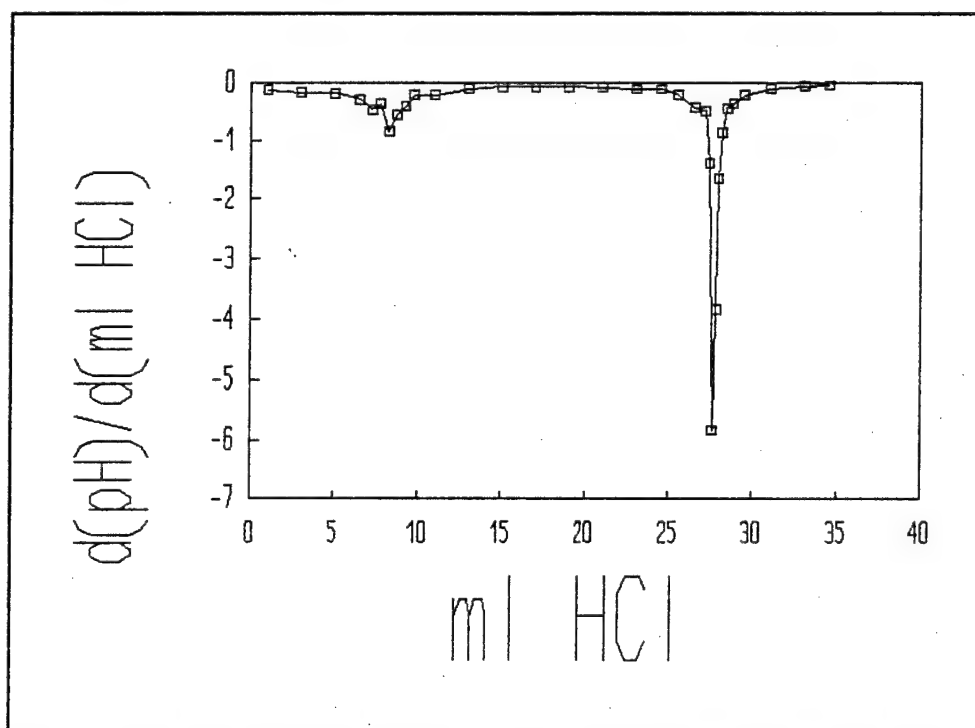


Figure C-20. First Derivative Of The Third Titration Curve For Titration Of Total Fresh Sodium Bicarbonate Media With 0.981 M HCl.

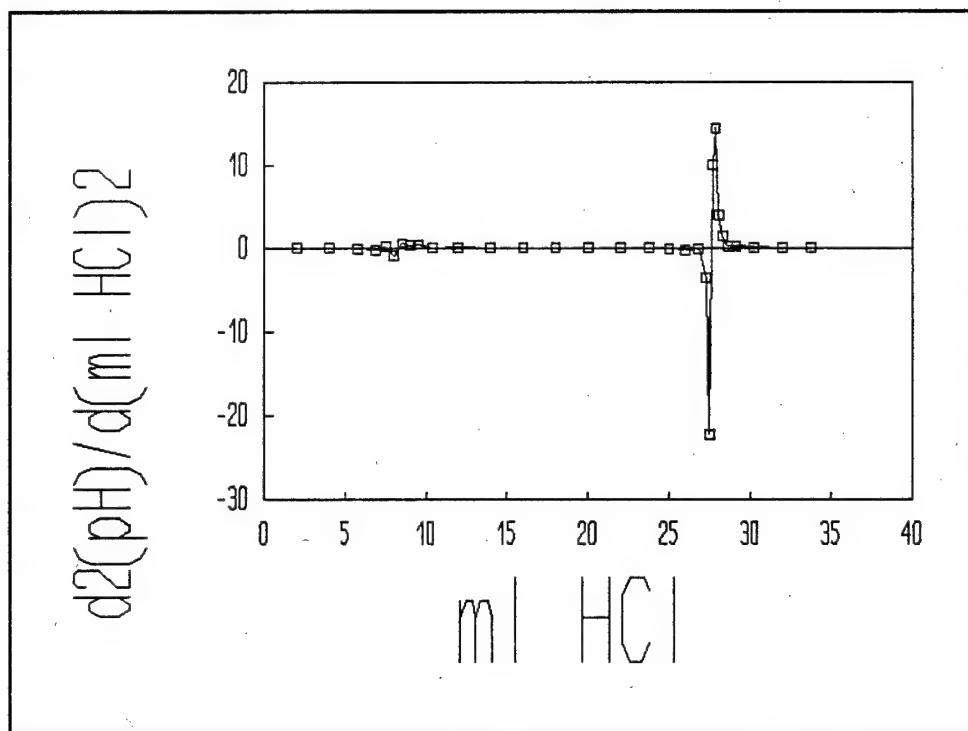


Figure C-21. Second Derivative Of The Third Titration Curve For Titration Of Total Fresh Sodium Bicarbonate Media With 0.981 M HCl.

TABLE 8. TOTAL FRESH SODIUM BICARBONATE MEDIA - TITRATION 4.

<u>ml 0.981M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	10.079	1.00	-0.13	2.00	-0.01
2.0	9.820	3.00	-0.15	4.00	-0.03
4.0	9.525	5.00	-0.21	5.75	-0.04
6.0	9.109	6.50	-0.27	6.88	-0.31
7.0	8.843	7.25	-0.50	7.50	-0.66
7.5	8.593	7.75	-0.83	8.00	0.37
8.0	8.177	8.25	-0.65	8.50	0.08
8.5	7.854	8.75	-0.61	9.00	0.60
9.0	7.550	9.25	-0.31	9.50	0.08
9.5	7.397	9.75	-0.26	10.38	0.08
10.0	7.265	11.00	-0.16	12.00	0.02
12.0	6.946	13.00	-0.11	14.00	0.02
14.0	6.726	15.00	-0.07	16.00	0.01
16.0	6.580	17.00	-0.06	18.00	-0.00
18.0	6.457	19.00	-0.07	20.00	0.01
20.0	6.323	21.00	-0.04	22.00	-0.04
22.0	6.238	23.00	-0.12	23.75	-0.02
24.0	6.006	24.50	-0.15	25.00	-0.02
25.0	5.855	25.50	-0.17	26.00	-0.12
26.0	5.684	26.50	-0.29	26.80	0.11
27.0	5.395	27.10	-0.22	27.20	-0.55
27.2	5.350	27.30	-0.34	27.40	-1.27
27.4	5.283	27.50	-0.59	27.60	-1.70
27.6	5.165	27.70	-0.93	27.80	-4.17
27.8	4.979	27.90	-1.76	27.97	-21.10
28.0	4.626	28.05	-4.93	28.10	-33.70
28.1	4.133	28.15	-8.30	28.23	38.47
28.2	3.303	28.30	-2.53	28.40	6.00
28.4	2.797	28.50	-1.33	28.60	4.05
28.6	2.531	28.70	-0.52	28.80	-0.72
28.8	2.427	28.90	-0.66	29.20	0.59
29.0	2.294	29.50	-0.31	30.00	0.16
30.0	1.982	30.50	-0.16	31.25	0.04
31.0	1.825	32.00	-0.09	33.00	0.03
33.0	1.638	34.00	-0.04	25.75	-0.01
35.0	1.553	17.50	0.04	8.75	0.00

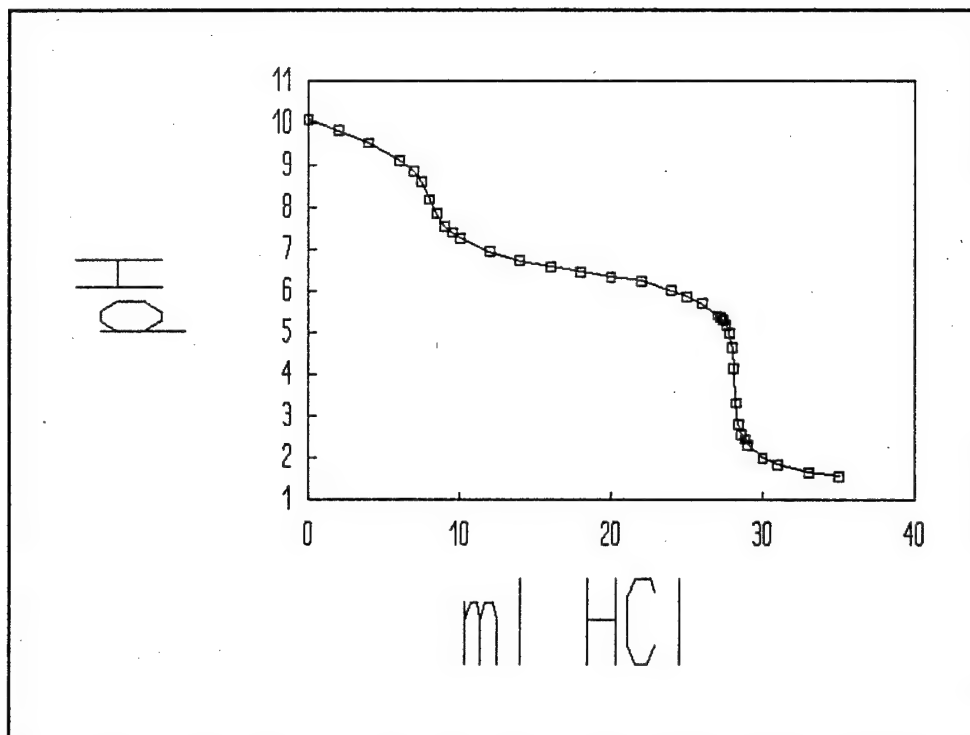


Figure C-22. Curve For The Fourth Titration Of Total Fresh Sodium Bicarbonate Media With 0.981 M HCl.

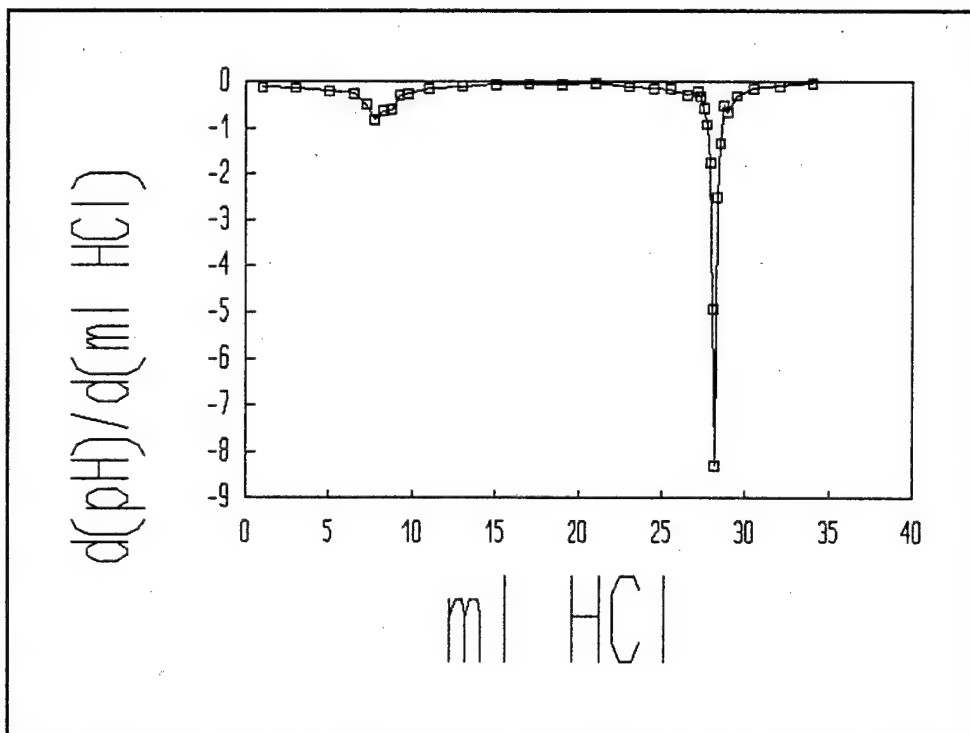


Figure C-23. First Derivative Of The Forth Titration Curve For Titration Of Total Fresh Sodium Bicarbonate Media With 0.981 M HCl.

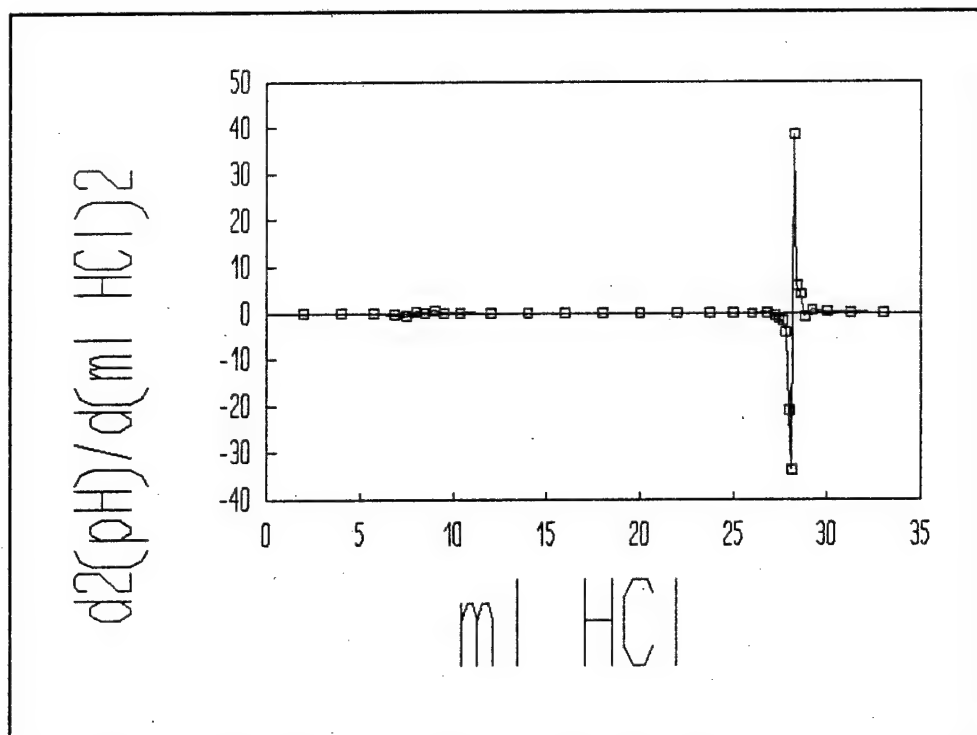


Figure C-24. Second Derivative Of The Fourth Titration Curve For Titration Of Total Fresh Sodium Bicarbonate Media With 0.981 M HCl.

TABLE 9. FRESH 600 MICRON SODIUM BICARBONATE MEDIA - TITRATION 1.

<u>ml 0.981M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	10.787	1.00	-0.30	2.00	0.06
2.0	10.189	3.00	-0.18	4.00	-0.07
4.0	9.834	5.00	-0.32	6.00	-0.33
6.0	9.194	7.00	-0.98	7.63	0.32
8.0	7.232	8.25	-0.58	8.50	0.60
8.5	6.943	8.75	-0.28	9.13	0.03
9.0	6.803	9.50	-0.26	10.00	0.03
10.0	6.543	10.50	-0.23	11.00	0.04
11.0	6.309	11.50	-0.20	12.00	-0.02
12.0	6.110	12.50	-0.22	12.88	0.02
13.0	5.891	13.25	-0.21	13.50	-0.06
13.5	5.788	13.75	-0.24	14.00	0.32
14.0	5.669	14.25	-0.08	14.50	-0.93
14.5	5.629	14.75	-0.54	14.93	-0.57
15.0	5.357	15.10	-0.75	15.20	-0.77
15.2	5.208	15.30	-0.90	15.40	-1.22
15.4	5.028	15.50	-1.14	15.58	-72.90
15.6	4.799	15.65	-12.08	15.70	59.40
15.7	3.591	15.75	-6.14	15.80	38.90
15.8	2.977	15.85	-2.25	15.90	2.40
15.9	2.752	15.95	-2.01	16.10	4.34
16.0	2.551	16.25	-0.71	16.50	0.78
16.5	2.197	16.75	-0.32	17.13	0.16
17.0	2.038	17.50	-0.20	18.00	0.09
18.0	1.841	18.50	-0.11	19.00	0.03
19.0	1.736	19.50	-0.08	14.75	-0.02
20.0	1.657	10.00	0.08	5.00	0.01

Note: Only one test was run with the 600 micron size fraction because there was not enough media to run additional tests.

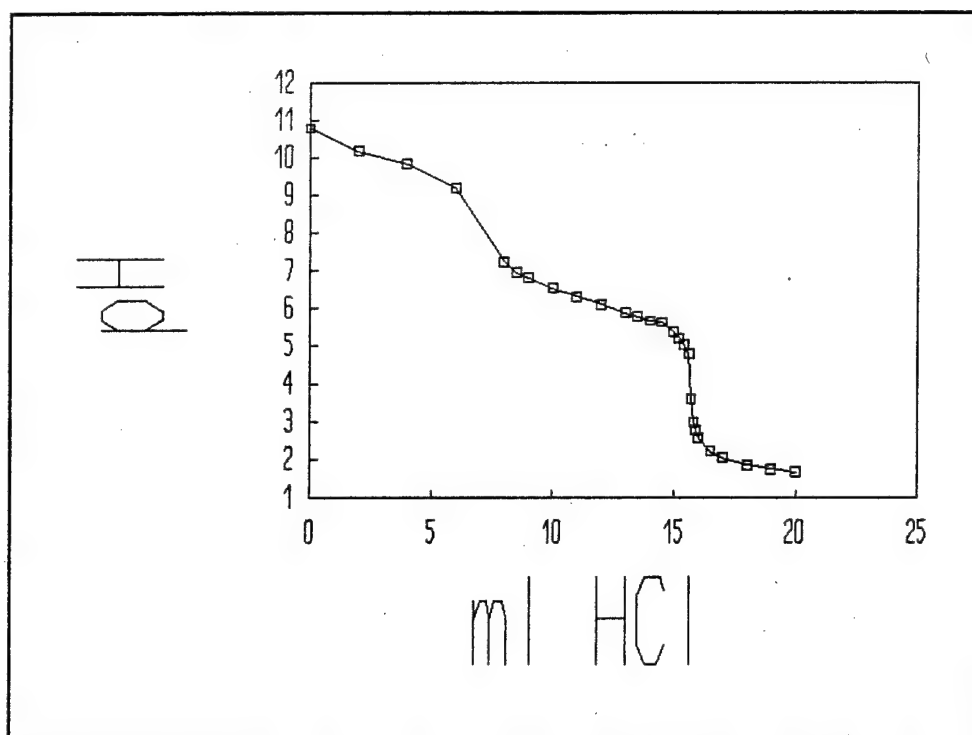


Figure C-25. Curve For The Titration Of Fresh 600 Micron Sodium Bicarbonate Media With 0.981 M HCl.

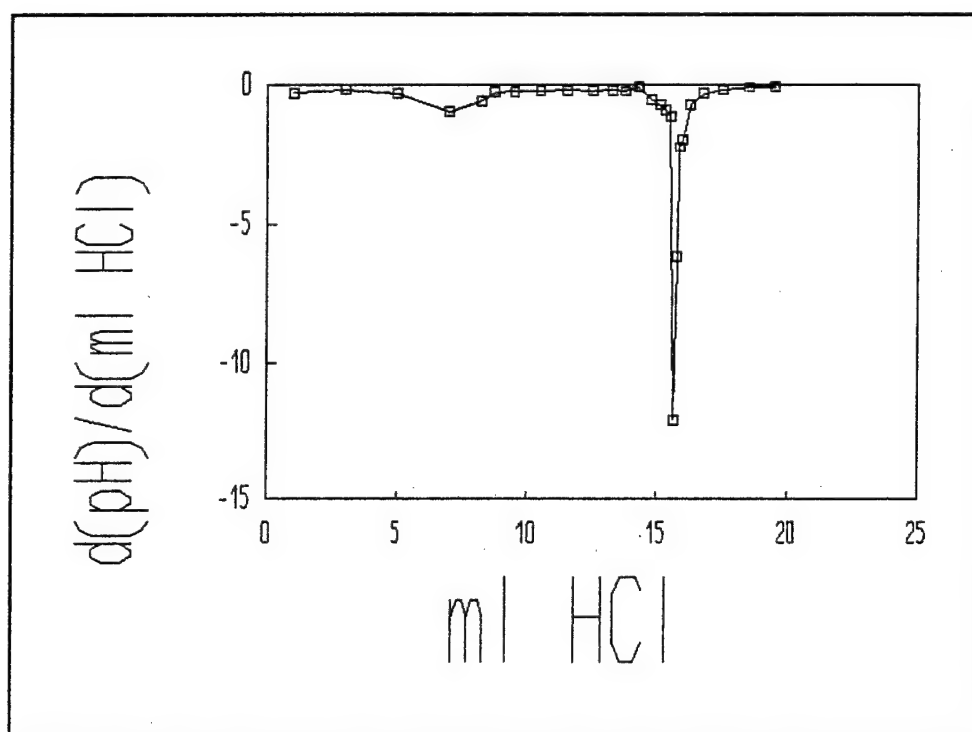


Figure C-26. First Derivative Of The Titration Curve For Titration Of Fresh 600 Micron Sodium Bicarbonate Media With 0.981 M HCl.

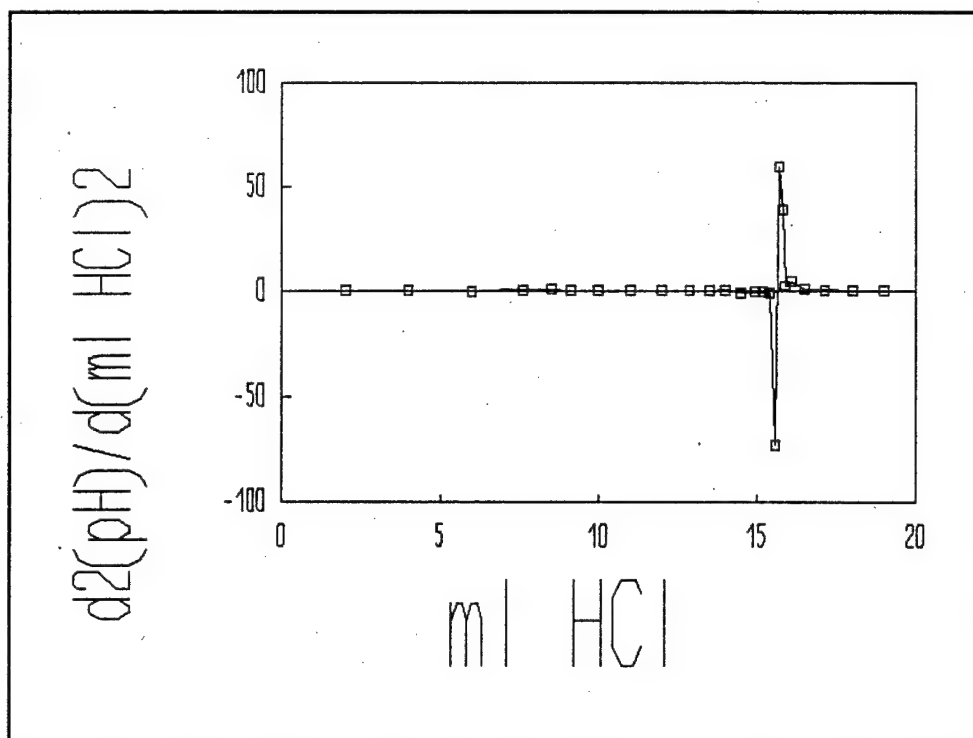


Figure C-27. Second Derivative Of The Titration Curve For Titration Of Fresh 600 Micron Sodium Bicarbonate Media With 0.981 M HCl.

TABLE 10. FRESH 425 MICRON SODIUM BICARBONATE MEDIA - TITRATION 1.

<u>ml 0.981M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	9.989	1.00	-0.07	2.00	-0.04
2.0	9.856	3.00	-0.15	4.00	0.02
4.0	9.563	5.00	-0.12	6.00	-0.00
6.0	9.330	7.00	-0.13	7.75	-0.02
8.0	9.080	8.50	-0.16	9.00	-0.08
9.0	8.922	9.50	-0.24	9.88	0.06
10.0	8.681	10.25	-0.20	10.50	-0.54
10.5	8.582	10.75	-0.47	11.00	0.01
11.0	8.349	11.25	-0.46	11.50	-0.72
11.5	8.119	11.75	-0.82	12.00	0.58
12.0	7.708	12.25	-0.53	12.50	0.39
12.5	7.443	12.75	-0.33	13.13	0.10
13.0	7.276	13.50	-0.26	14.25	0.07
14.0	7.015	15.00	-0.16	16.00	0.02
16.0	6.704	17.00	-0.11	18.00	0.02
18.0	6.493	19.00	-0.08	20.00	0.00
20.0	6.342	21.00	-0.07	22.00	-0.01
22.0	6.202	23.00	-0.09	24.00	-0.00
24.0	6.018	25.00	-0.10	25.75	-0.01
26.0	5.814	26.50	-0.12	26.88	0.15
27.0	5.691	27.25	-0.01	27.50	-0.37
27.5	5.685	27.75	-0.20	28.00	-0.06
28.0	5.587	28.25	-0.22	28.50	-0.19
28.5	5.475	28.75	-0.32	28.93	-0.81
29.0	5.315	29.10	-0.60	29.20	1.47
29.2	5.194	29.30	-0.31	29.40	-2.55
29.4	5.132	29.50	-0.82	29.60	-3.58
29.6	4.968	29.70	-1.54	29.80	3.25
29.8	4.661	29.90	-0.88	30.00	-27.77
30.0	4.484	30.10	-6.44	30.23	17.92
30.2	3.196	30.35	-1.96	30.55	3.31
30.5	2.608	30.75	-0.64	31.13	0.47
31.0	2.290	31.50	-0.29	32.00	0.14
32.0	2.004	32.50	-0.14	33.00	0.05
33.0	1.861	33.50	-0.10	34.00	0.02
34.0	1.763	34.50	-0.08	26.00	-0.01
35.0	1.688	17.50	0.05	8.75	0.00

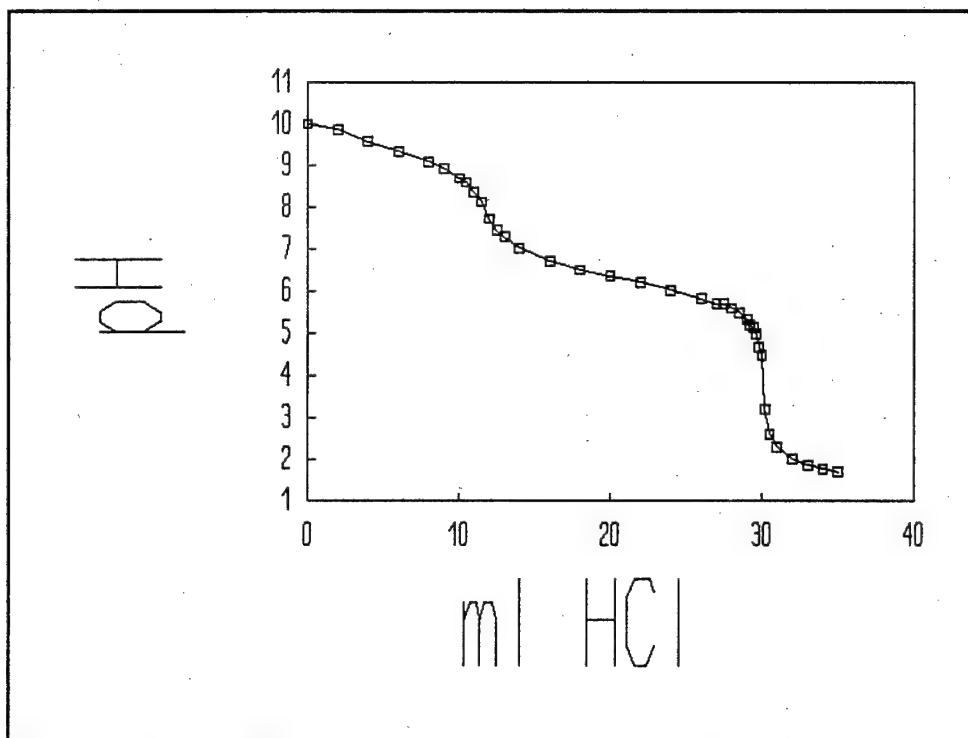


Figure C-28. Curve For The First Titration Of Fresh 425 Micron Sodium Bicarbonate Media With 0.981 M HCl.

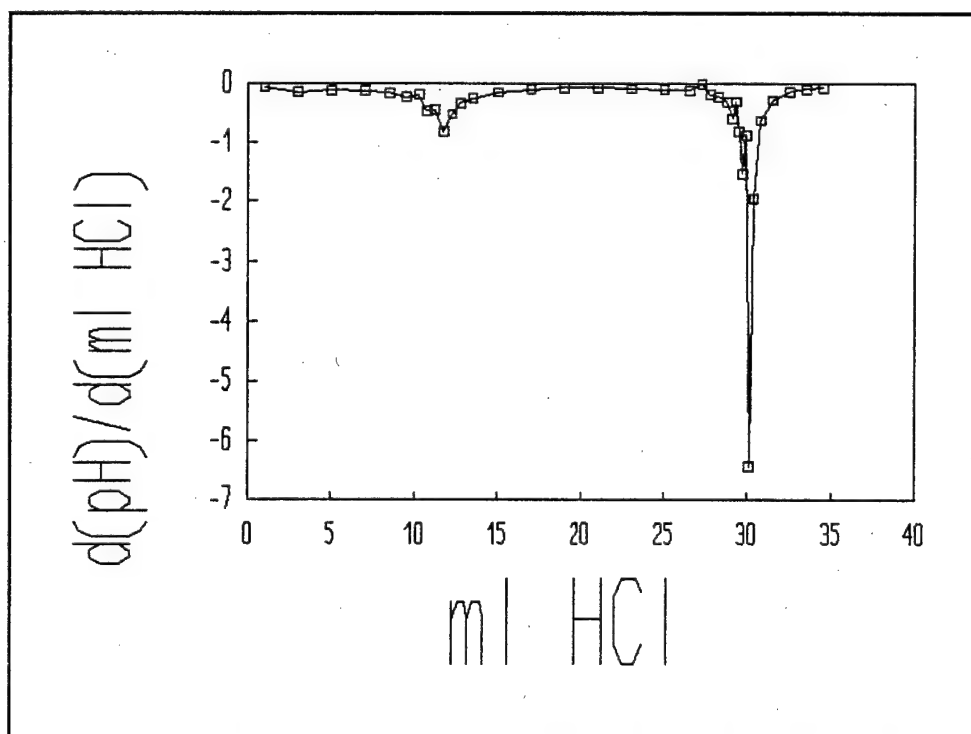


Figure C-29. First Derivative Of The First Titration Curve For Titration Of Fresh 425 Micron Sodium Bicarbonate Media With 0.981 M HCl.

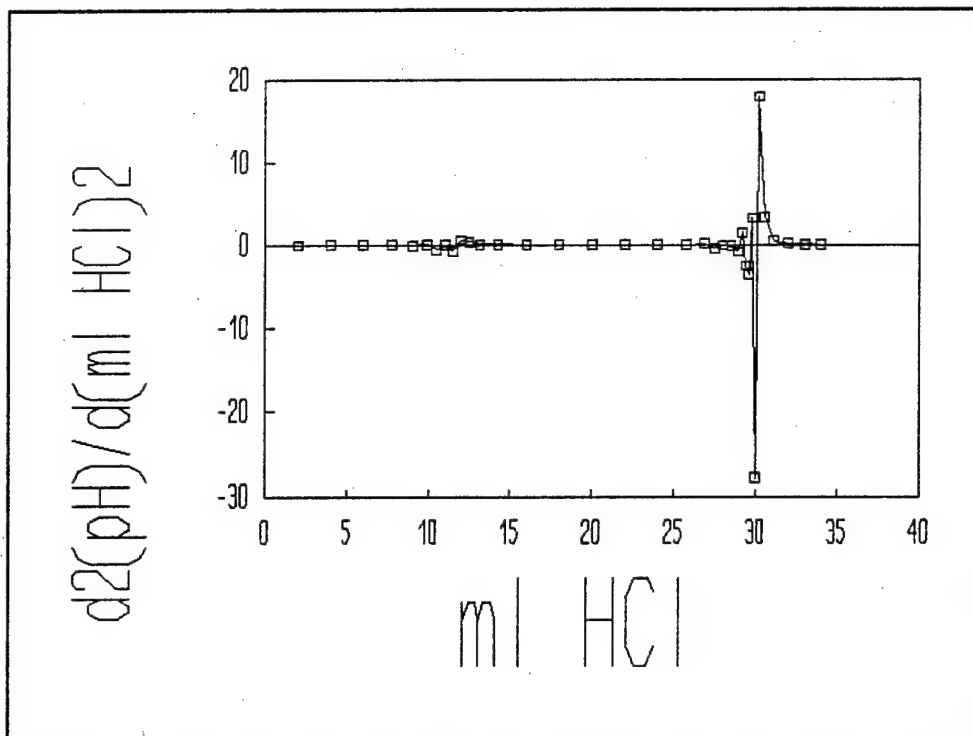


Figure C-30. Second Derivative Of The First Titration Curve For Titration Of Fresh 425 Micron Sodium Bicarbonate Media With 0.981 M HCl.

TABLE 11. FRESH 425 MICRON SODIUM BICARBONATE MEDIA - TITRATION 2.

<u>ml 0.981M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	10.012	1.00	-0.11	2.00	0.01
2.0	9.791	3.00	-0.10	4.00	0.00
4.0	9.596	5.00	-0.09	6.00	-0.01
6.0	9.410	7.00	-0.11	8.00	-0.03
8.0	9.188	9.00	-0.16	9.75	-0.05
10.0	8.864	10.50	-0.24	11.00	-0.19
11.0	8.620	11.50	-0.43	11.88	-0.68
12.0	8.188	12.25	-0.94	12.50	0.86
12.5	7.718	12.75	-0.51	13.00	0.17
13.0	7.464	13.25	-0.42	13.50	0.32
13.5	7.252	13.75	-0.26	14.38	0.05
14.0	7.121	15.00	-0.20	16.00	0.03
16.0	6.729	17.00	-0.13	18.00	0.02
18.0	6.465	19.00	-0.09	20.00	-0.00
20.0	6.277	21.00	-0.10	22.00	-0.01
22.0	6.081	23.00	-0.12	24.00	-0.02
24.0	5.849	25.00	-0.16	26.00	-0.11
26.0	5.537	27.00	-0.39	27.55	-1.40
28.0	4.766	28.10	-1.93	28.20	-20.50
28.2	4.380	28.30	-6.03	28.40	18.55
28.4	3.174	28.50	-2.32	28.60	7.42
28.6	2.710	28.70	-0.84	28.80	0.25
28.8	2.543	28.90	-0.78	29.08	1.03
29.0	2.386	29.25	-0.43	29.50	0.35
29.5	2.173	29.75	-0.25	30.13	0.13
30.0	2.048	30.50	-0.15	31.00	0.03
31.0	1.899	31.50	-0.11	32.00	0.05
32.0	1.785	32.50	-0.07	33.00	0.01
33.0	1.717	33.50	-0.06	34.00	0.01
34.0	1.656	34.50	-0.05	26.00	-0.01
35.0	1.604	17.50	0.05	8.75	0.00

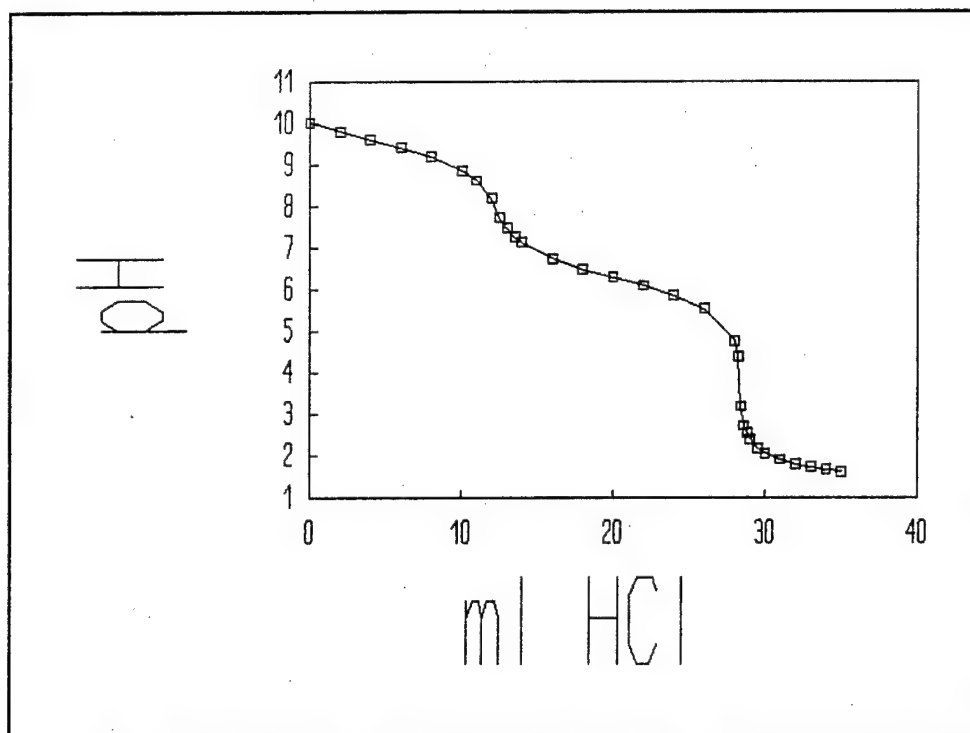


Figure C-31. Curve For The Second Titration Of Fresh 425 Micron Sodium Bicarbonate Media With 0.981 M HCl.

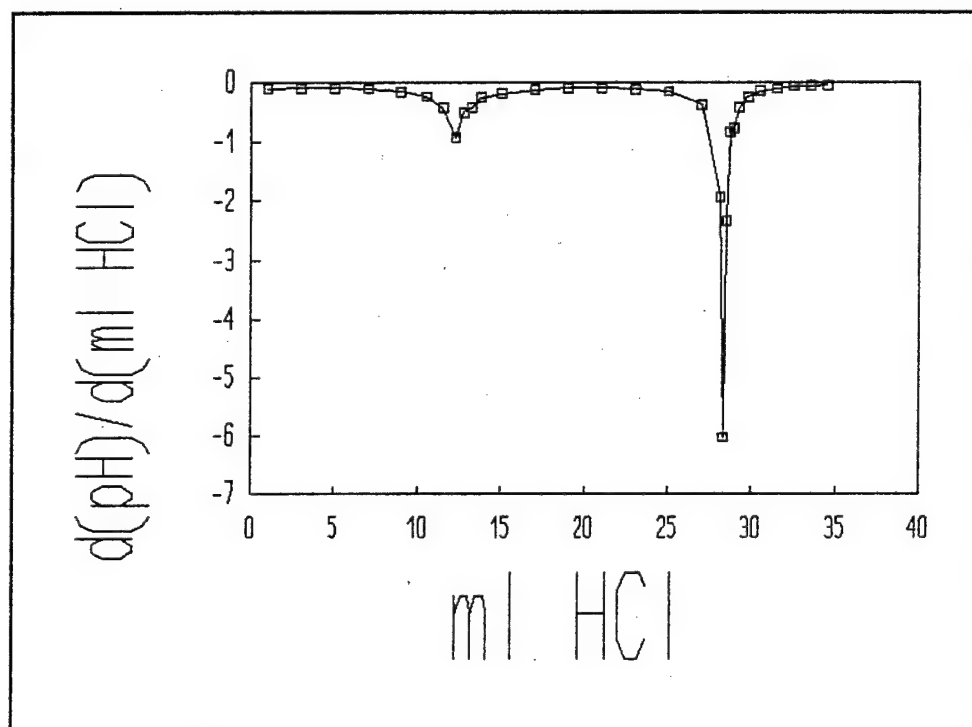


Figure C-32. First Derivative Of The Second Titration Curve For Titration Of Fresh 425 Micron Sodium Bicarbonate Media With 0.981 M HCl.

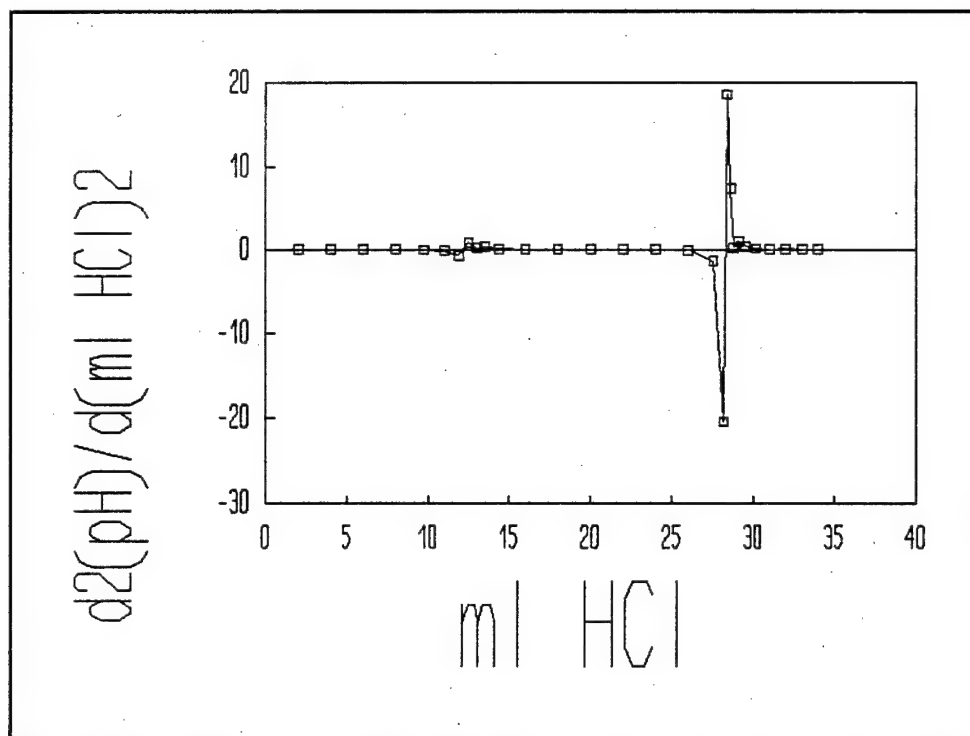


Figure C-33. Second Derivative Of The Second Titration Curve For Titration Of Fresh 425 Micron Sodium Bicarbonate Media With 0.981 M HCl.

TABLE 12. FRESH 425 MICRON SODIUM BICARBONATE MEDIA - TITRATION 3.

<u>ml 0.981M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	10.192	1.00	-0.15	2.00	0.01
2.0	9.899	3.00	-0.13	4.00	0.00
4.0	9.642	5.00	-0.12	6.00	-0.03
6.0	9.393	7.00	-0.19	8.00	-0.09
8.0	9.014	9.00	-0.36	9.63	-0.38
10.0	8.289	10.25	-0.84	10.50	0.10
10.5	7.868	10.75	-0.79	11.00	0.89
11.0	7.472	11.25	-0.35	11.50	-0.12
11.5	7.299	11.75	-0.40	12.38	0.17
12.0	7.097	13.00	-0.19	14.00	0.04
14.0	6.720	15.00	-0.10	16.00	0.01
16.0	6.512	17.00	-0.08	18.00	0.00
18.0	6.344	19.00	-0.08	20.00	-0.01
20.0	6.185	21.00	-0.10	22.00	-0.01
22.0	5.989	23.00	-0.11	23.75	-0.03
24.0	5.763	24.50	-0.16	24.88	-0.02
25.0	5.607	25.25	-0.17	25.50	-0.37
25.5	5.523	25.75	-0.35	25.95	-0.15
26.0	5.347	26.15	-0.41	26.28	0.74
26.3	5.224	26.40	-0.22	26.53	-2.82
26.5	5.179	26.65	-0.93	26.78	-3.30
26.8	4.900	26.90	-1.75	27.03	-12.66
27.0	4.549	27.15	-4.92	27.28	11.86
27.3	3.073	27.40	-1.95	27.58	3.47
27.5	2.682	27.75	-0.74	28.00	0.83
28.0	2.312	28.25	-0.33	28.50	0.30
28.5	2.149	28.75	-0.18	29.13	0.04
29.0	2.060	29.50	-0.15	30.00	0.05
30.0	1.910	30.50	-0.10	31.25	0.02
31.0	1.810	32.00	-0.07	33.00	-0.00
33.0	1.669	34.00	-0.08	25.75	-0.01
35.0	1.509	17.50	0.04	8.75	0.00

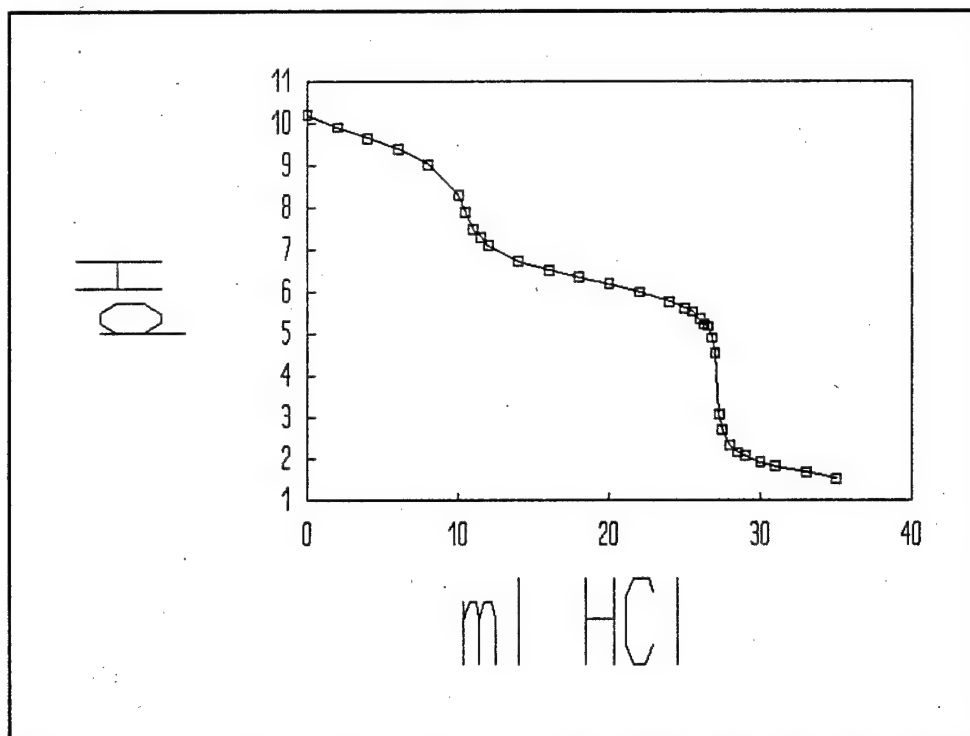


Figure C-34. Curve For The Third Titration Of Fresh 425 Micron Sodium Bicarbonate Media With 0.981 M HCl.

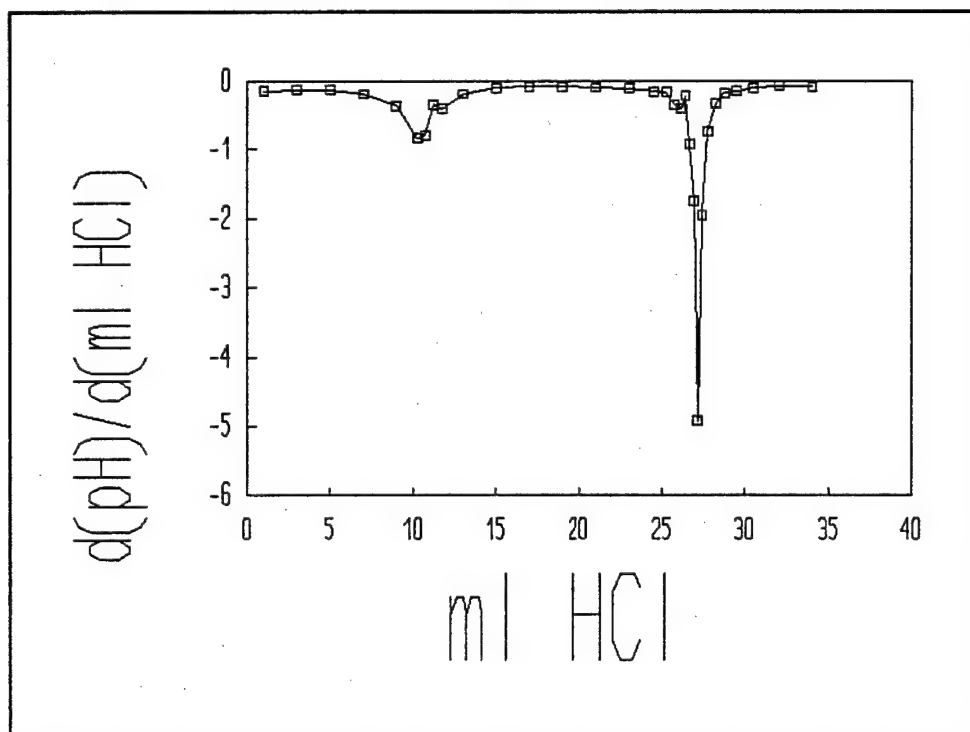


Figure C-35. First Derivative Of The Third Titration Curve For Titration Of Fresh 425 Micron Sodium Bicarbonate Media With 0.981 M HCl.

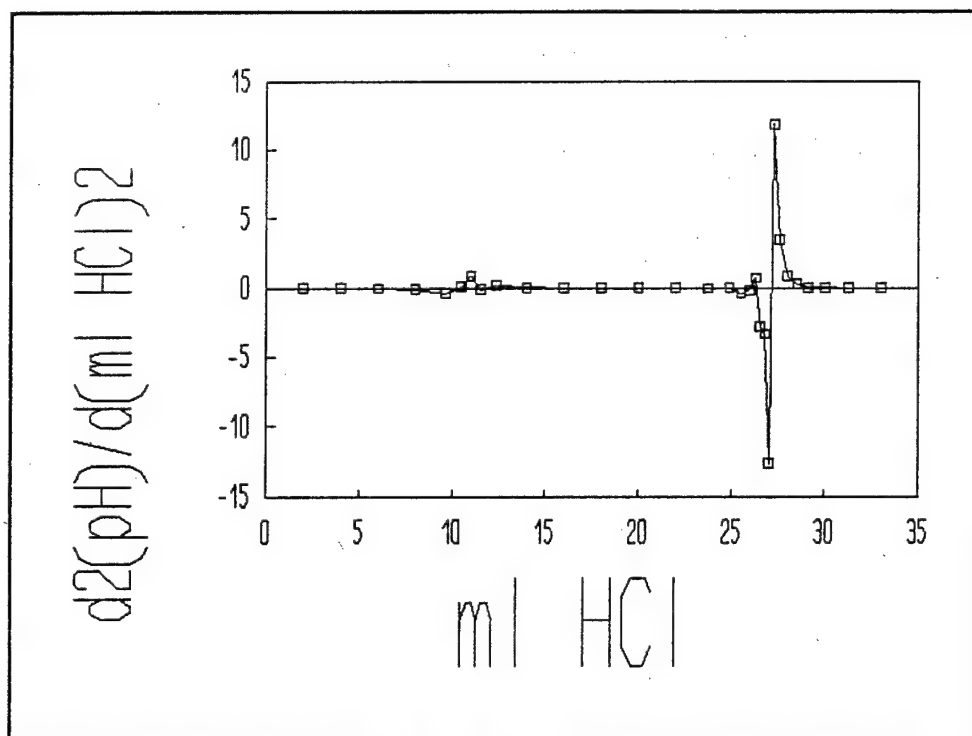


Figure C-36. Second Derivative Of The Third Titration Curve For Titration Of Fresh 425 Micron Sodium Bicarbonate Media With 0.981 M HCl.

TABLE 13. FRESH 250 MICRON SODIUM BICARBONATE MEDIA - TITRATION 1.

<u>ml 0.961M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	9.636	1.00	-0.22	1.75	0.03
2.0	9.200	2.50	-0.17	3.00	-0.06
3.0	9.030	3.50	-0.23	3.88	-0.17
4.0	8.796	4.25	-0.36	4.50	-0.10
4.5	8.617	4.75	-0.41	5.00	-0.42
5.0	8.413	5.25	-0.62	5.50	-0.40
5.5	8.104	5.75	-0.82	6.00	0.55
6.0	7.695	6.25	-0.54	6.50	0.22
6.5	7.423	6.75	-0.43	7.38	0.18
7.0	7.207	8.00	-0.20	9.00	0.04
9.0	6.804	10.00	-0.11	11.00	0.02
11.0	6.579	12.00	-0.07	13.00	-0.00
13.0	6.437	14.00	-0.07	15.00	0.00
15.0	6.290	16.00	-0.07	17.00	-0.00
17.0	6.145	18.00	-0.08	18.75	-0.01
19.0	5.990	19.50	-0.10	20.00	0.01
20.0	5.892	20.50	-0.08	21.00	-0.09
21.0	5.809	21.50	-0.17	21.88	-0.02
22.0	5.639	22.25	-0.19	22.50	-0.16
22.5	5.546	22.75	-0.27	23.00	-0.24
23.0	5.412	23.25	-0.39	23.50	-1.36
23.5	5.217	23.75	-1.07	23.93	-5.27
24.0	4.682	24.10	-2.91	24.20	-11.33
24.2	4.099	24.30	-5.18	24.40	17.15
24.4	3.063	24.50	-1.75	24.60	5.22
24.6	2.713	24.70	-0.71	24.80	-2.35
24.8	2.521	24.90	-1.17	25.08	2.54
25.0	2.337	25.25	-0.29	25.50	0.08
25.5	2.194	25.75	-0.25	26.13	0.12
26.0	2.070	26.50	-0.15	27.00	0.06
27.0	1.915	27.50	-0.10	28.00	0.02
28.0	1.816	28.50	-0.08	29.00	0.01
29.0	1.739	29.50	-0.06	22.25	-0.01
30.0	1.675	15.00	0.06	7.50	0.00

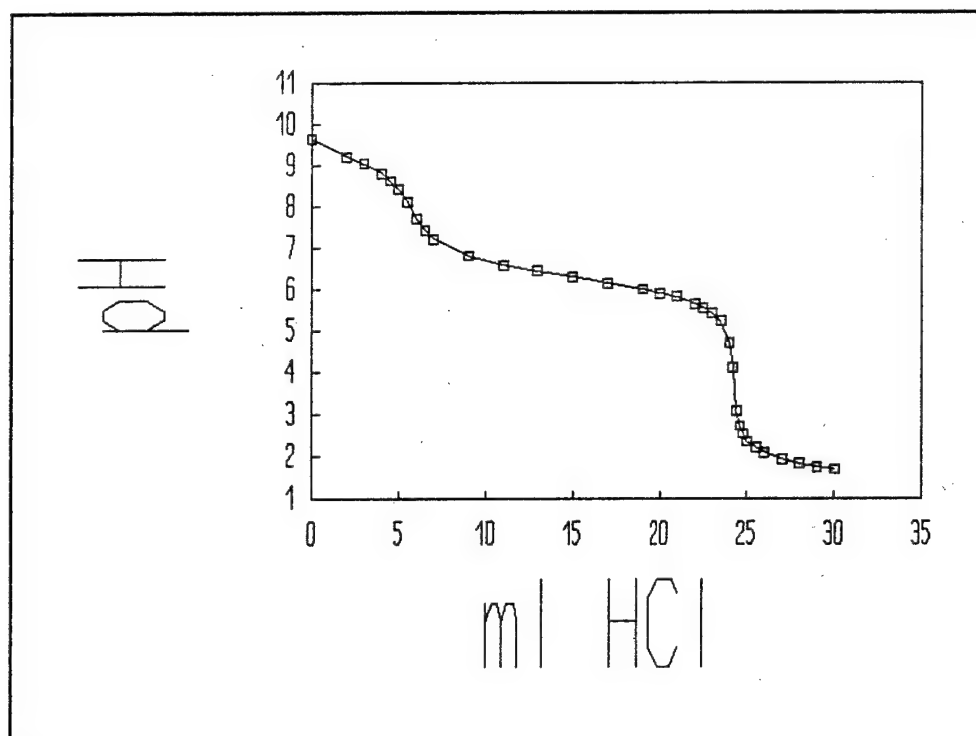


Figure C-37. Curve For The First Titration Of Fresh 250 Micron Sodium Bicarbonate Media With 0.961 M HCl.

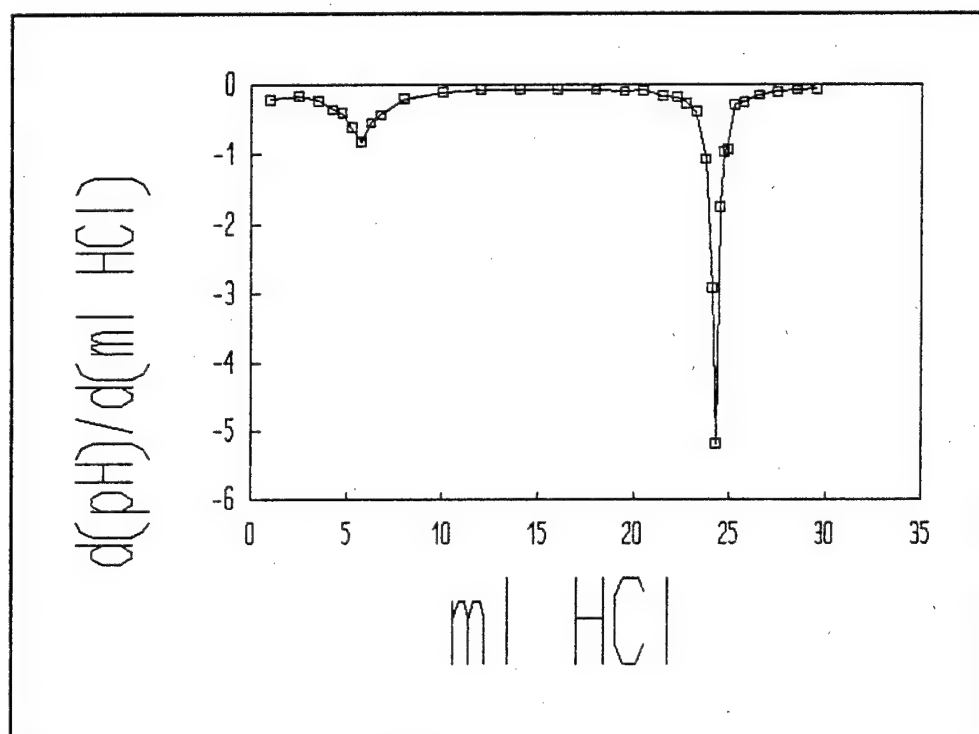


Figure C-38. First Derivative Of The First Titration Curve For Titration Of Fresh 250 Micron Sodium Bicarbonate Media With 0.961 M HCl.

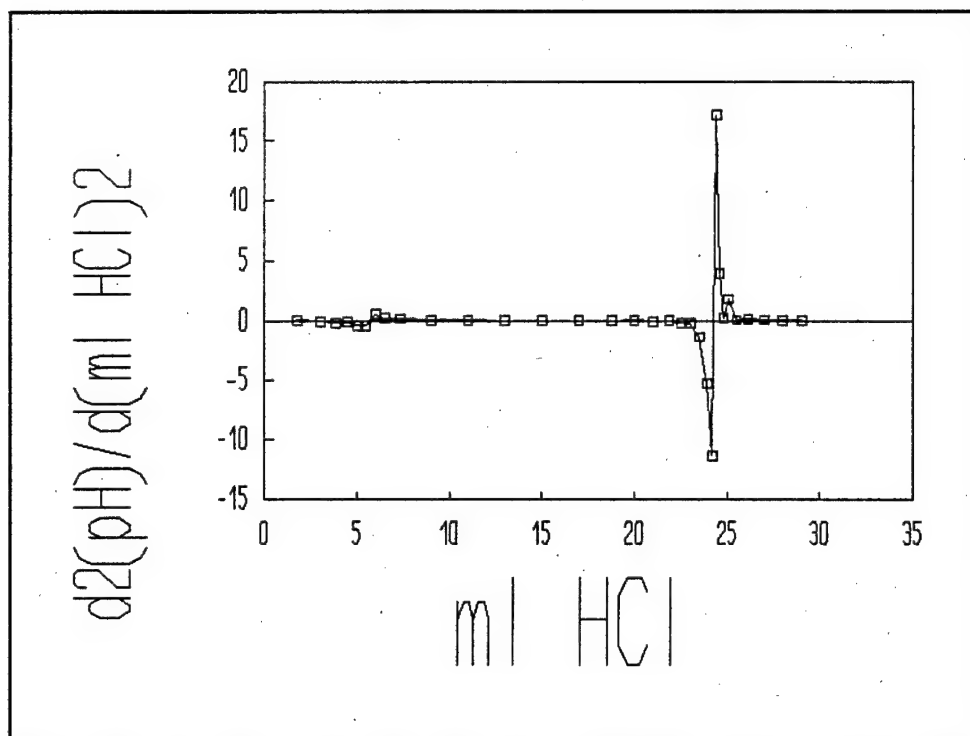


Figure C-39. Second Derivative Of The First Titration Curve For Titration Of Fresh 250 Micron Sodium Bicarbonate Media With 0.961 M HCl.

TABLE 14. FRESH 250 MICRON SODIUM BICARBONATE MEDIA - TITRATION 2.

<u>ml 0.961M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	9.559	1.00	-0.20	1.75	-0.03
2.0	9.163	2.50	-0.24	3.00	-0.09
3.0	8.922	3.50	-0.33	3.88	-0.30
4.0	8.592	4.25	-0.56	4.50	-0.34
4.5	8.314	4.75	-0.73	5.00	-0.11
5.0	7.950	5.25	-0.78	5.50	0.67
5.5	7.559	5.75	-0.45	6.00	0.26
6.0	7.336	6.25	-0.31	6.50	0.15
6.5	7.179	6.75	-0.24	7.38	0.05
7.0	7.059	8.00	-0.17	9.00	0.04
9.0	6.715	10.00	-0.10	11.00	0.01
11.0	6.521	12.00	-0.09	13.00	0.02
13.0	6.348	14.00	-0.05	15.00	0.00
15.0	6.243	16.00	-0.04	17.00	-0.03
17.0	6.158	18.00	-0.10	18.75	0.01
19.0	5.960	19.50	-0.08	20.00	-0.06
20.0	5.877	20.50	-0.14	21.00	-0.04
21.0	5.735	21.50	-0.18	21.88	0.03
22.0	5.550	22.25	-0.16	22.50	-0.41
22.5	5.469	22.75	-0.37	22.95	-1.13
23.0	5.285	23.15	-0.82	23.28	-0.36
23.3	5.039	23.40	-0.91	23.50	-3.95
23.5	4.857	23.60	-1.70	23.73	-12.79
23.7	4.517	23.85	-4.90	24.05	9.08
24.0	3.048	24.25	-1.26	24.50	1.68
24.5	2.416	24.75	-0.42	25.13	0.27
25.0	2.204	25.50	-0.22	26.00	0.11
26.0	1.980	26.50	-0.11	27.00	0.02
27.0	1.871	27.50	-0.09	28.00	0.02
28.0	1.784	28.50	-0.07	29.00	0.01
29.0	1.714	29.50	-0.06	22.25	-0.01
30.0	1.655	15.00	0.06	7.50	0.00

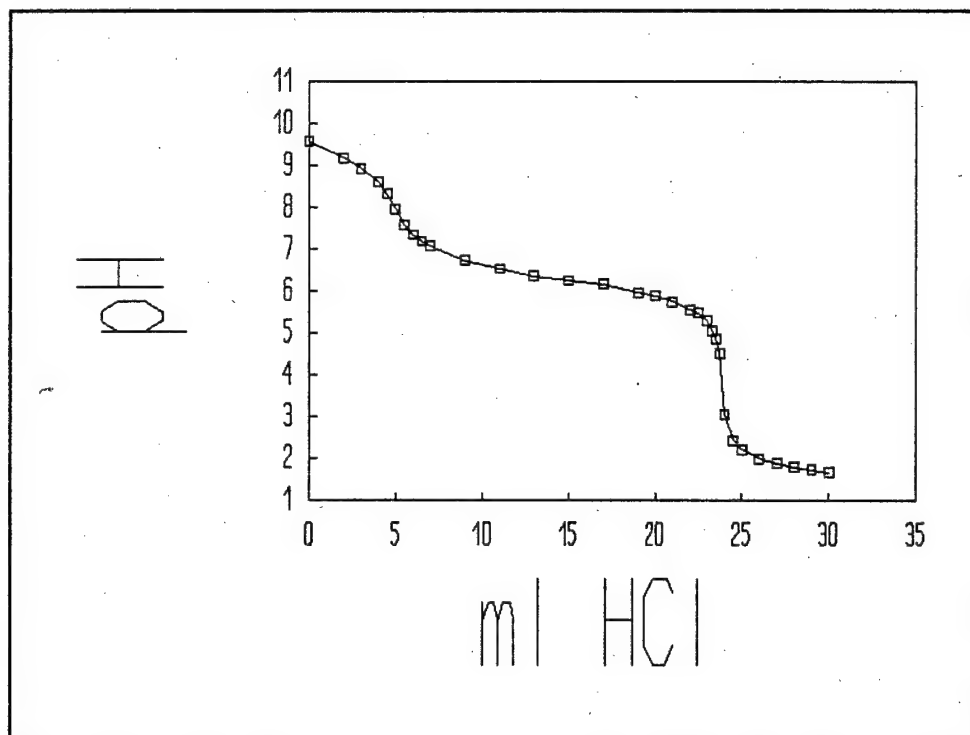


Figure C-40. Curve For The Second Titration Of Fresh 250 Micron Sodium Bicarbonate Media With 0.961 M HCl.

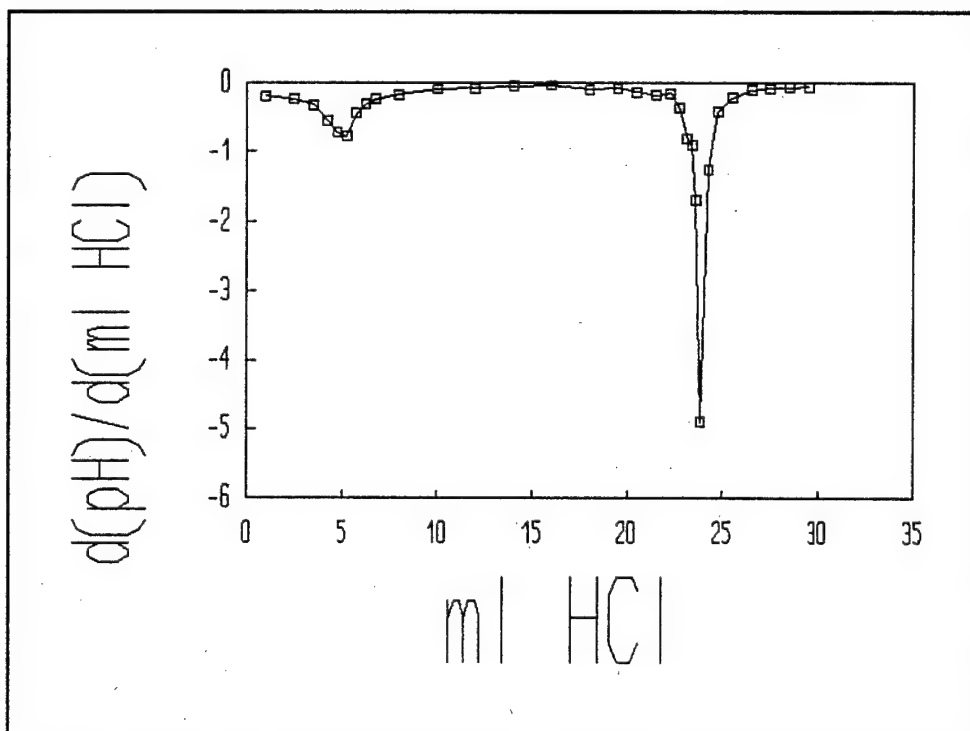


Figure C-41. First Derivative Of The Second Titration Curve For Titration Of Fresh 250 Micron Sodium Bicarbonate Media With 0.961 M HCl.

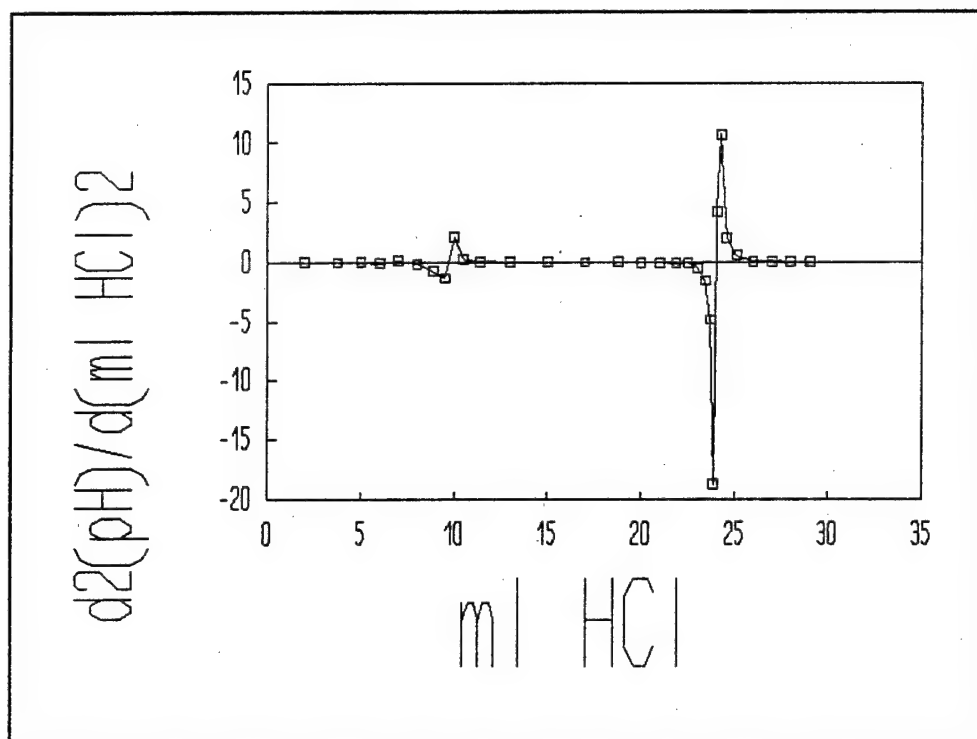


Figure C-42. Second Derivative Of The Second Titration Curve For Titration Of Fresh 250 Micron Sodium Bicarbonate Media With 0.961 M HCl.

TABLE 15. FRESH 250 MICRON SODIUM BICARBONATE MEDIA - TITRATION 3.

<u>ml 0.961M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	9.698	1.00	-0.12	2.00	0.01
2.0	9.467	3.00	-0.10	3.75	-0.02
4.0	9.270	4.50	-0.13	5.00	0.04
5.0	9.144	5.50	-0.09	6.00	-0.12
6.0	9.058	6.50	-0.20	7.00	0.14
7.0	8.857	7.50	-0.06	8.00	-0.18
8.0	8.794	8.50	-0.24	8.88	-0.74
9.0	8.556	9.25	-0.79	9.50	-1.31
9.5	8.161	9.75	-1.44	10.00	2.08
10.0	7.439	10.25	-0.40	10.50	0.24
10.5	7.238	10.75	-0.28	11.38	0.07
11.0	7.096	12.00	-0.20	13.00	0.05
13.0	6.695	14.00	-0.11	15.00	0.00
15.0	6.478	16.00	-0.10	17.00	-0.00
17.0	6.276	18.00	-0.10	18.75	0.00
19.0	6.072	19.50	-0.10	20.00	-0.02
20.0	5.971	20.50	-0.13	21.00	-0.05
21.0	5.845	21.50	-0.17	21.88	-0.09
22.0	5.671	22.25	-0.24	22.50	-0.06
22.5	5.551	22.75	-0.27	23.00	-0.50
23.0	5.415	23.25	-0.52	23.43	-1.56
23.5	5.155	23.60	-1.06	23.70	-4.83
23.7	4.942	23.80	-2.03	23.88	-18.80
23.9	4.536	23.95	-4.85	24.05	4.18
24.0	4.051	24.15	-4.01	24.28	10.67
24.3	2.847	24.40	-1.34	24.58	1.99
24.5	2.578	24.75	-0.65	25.13	0.55
25.0	2.253	25.50	-0.24	26.00	0.09
26.0	2.016	26.50	-0.15	27.00	0.05
27.0	1.867	27.50	-0.10	28.00	0.03
28.0	1.771	28.50	-0.07	29.00	0.01
29.0	1.703	29.50	-0.06	22.25	-0.01
30.0	1.641	15.00	0.05	7.50	0.00

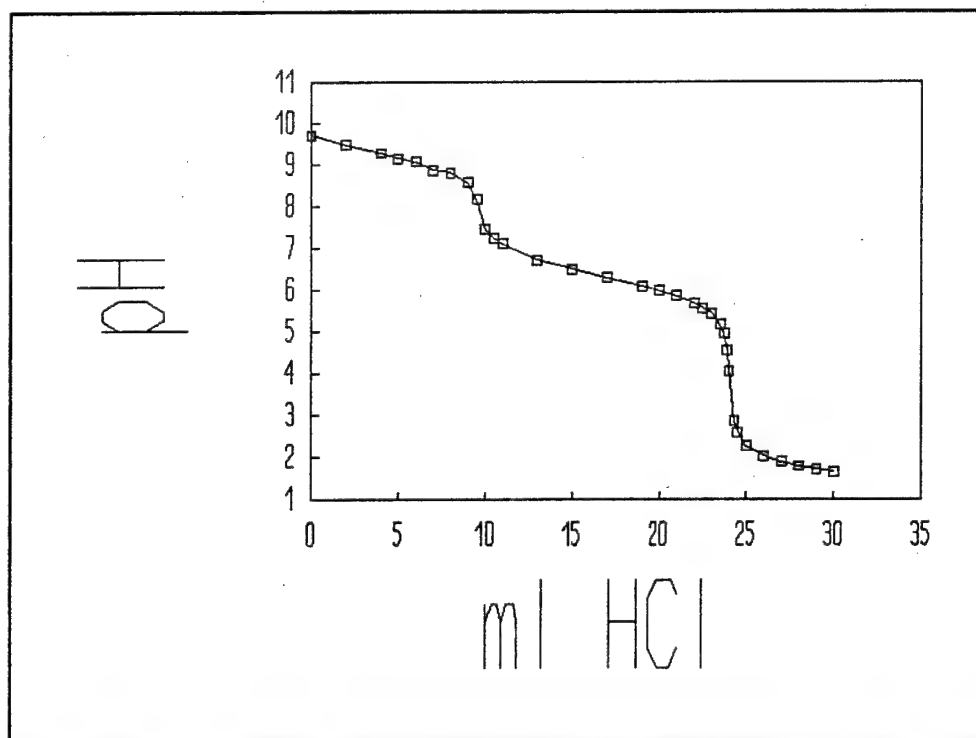


Figure C-43. Curve For The Third Titration Of Fresh 250 Micron Sodium Bicarbonate Media With 0.961 M HCl.

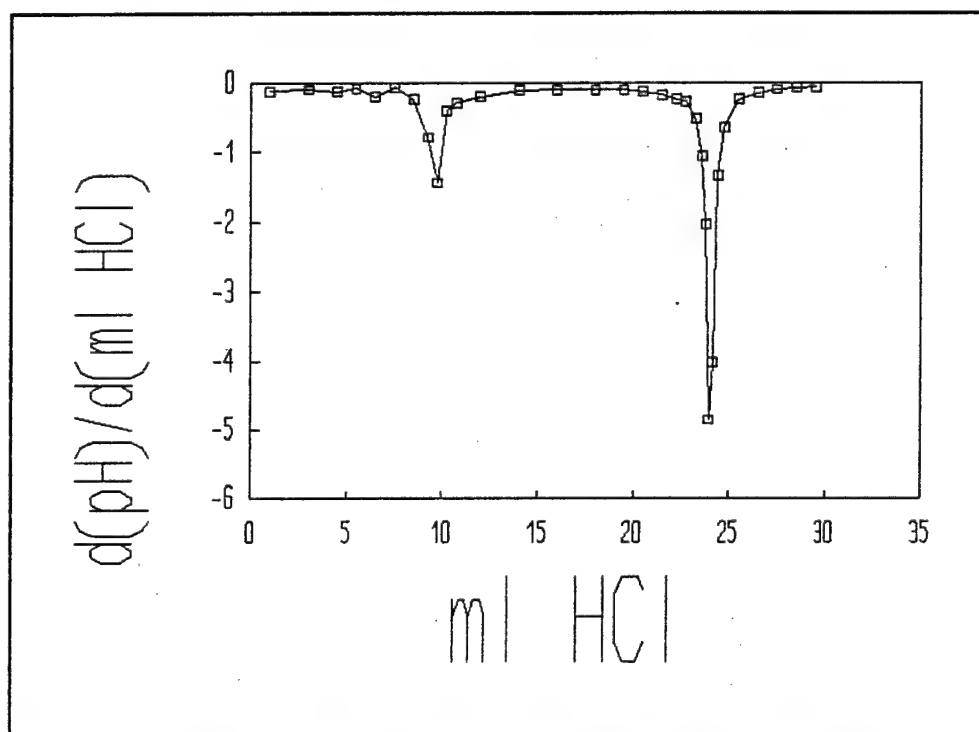


Figure C-44. First Derivative Of The Third Titration Curve For Titration Of Fresh 250 Micron Sodium Bicarbonate Media With 0.961 M HCl.

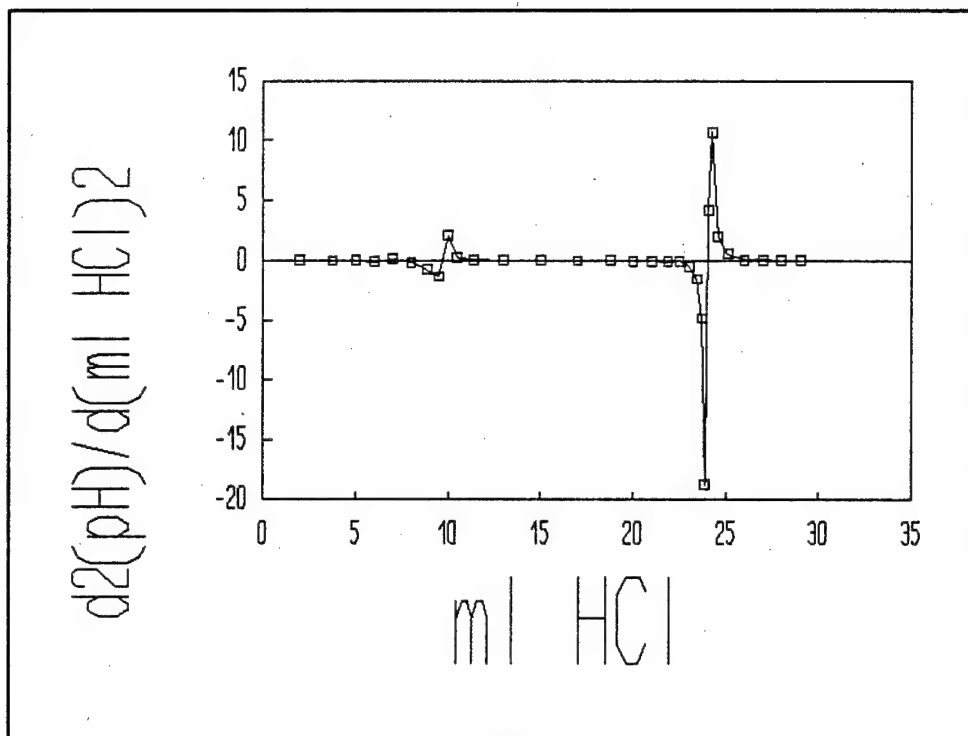


Figure C-45. Second Derivative Of The Third Titration Curve For Titration Of Fresh 250 Micron Sodium Bicarbonate Media With 0.961 M HCl.

TABLE 16. FRESH 250 MICRON SODIUM BICARBONATE MEDIA - TITRATION 4.

<u>ml 0.961M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	9.673	1.00	-0.11	2.00	-0.04
2.0	9.449	3.00	-0.19	3.75	-0.09
4.0	9.074	4.50	-0.32	5.00	-0.26
5.0	8.755	5.50	-0.58	5.88	-0.36
6.0	8.176	6.25	-0.85	6.50	0.57
6.5	7.750	6.75	-0.57	7.00	0.46
7.0	7.466	7.25	-0.34	7.50	0.06
7.5	7.296	7.75	-0.31	8.38	0.09
8.0	7.141	9.00	-0.20	10.00	0.03
10.0	6.734	11.00	-0.14	12.00	0.05
12.0	6.445	13.00	-0.04	14.00	-0.03
14.0	6.371	15.00	-0.09	16.00	0.00
16.0	6.184	17.00	-0.09	18.00	-0.01
18.0	6.007	19.00	-0.11	19.75	-0.05
20.0	5.781	20.50	-0.18	20.88	0.21
21.0	5.598	21.25	-0.02	21.50	-0.44
21.5	5.586	21.75	-0.24	21.93	0.01
22.0	5.464	22.10	-0.24	22.20	-0.03
22.2	5.416	22.30	-0.25	22.40	-1.12
22.4	5.367	22.50	-0.47	22.60	-2.78
22.6	5.273	22.70	-1.03	22.80	3.03
22.8	5.068	22.90	-0.42	23.00	-8.17
23.0	4.984	23.10	-2.05	23.20	-22.45
23.2	4.573	23.30	-6.55	23.40	18.33
23.4	3.264	23.50	-2.88	23.60	8.77
23.6	2.688	23.70	-1.13	23.80	2.50
23.8	2.463	23.90	-0.62	24.08	0.58
24.0	2.338	24.25	-0.42	24.50	0.37
24.5	2.127	24.75	-0.24	25.13	0.07
25.0	2.009	25.50	-0.19	26.00	0.08
26.0	1.822	26.50	-0.11	27.00	0.04
27.0	1.717	27.50	-0.06	28.25	-0.00
28.0	1.655	29.00	-0.07	22.00	-0.01
30.0	1.523	15.00	0.05	7.50	0.00

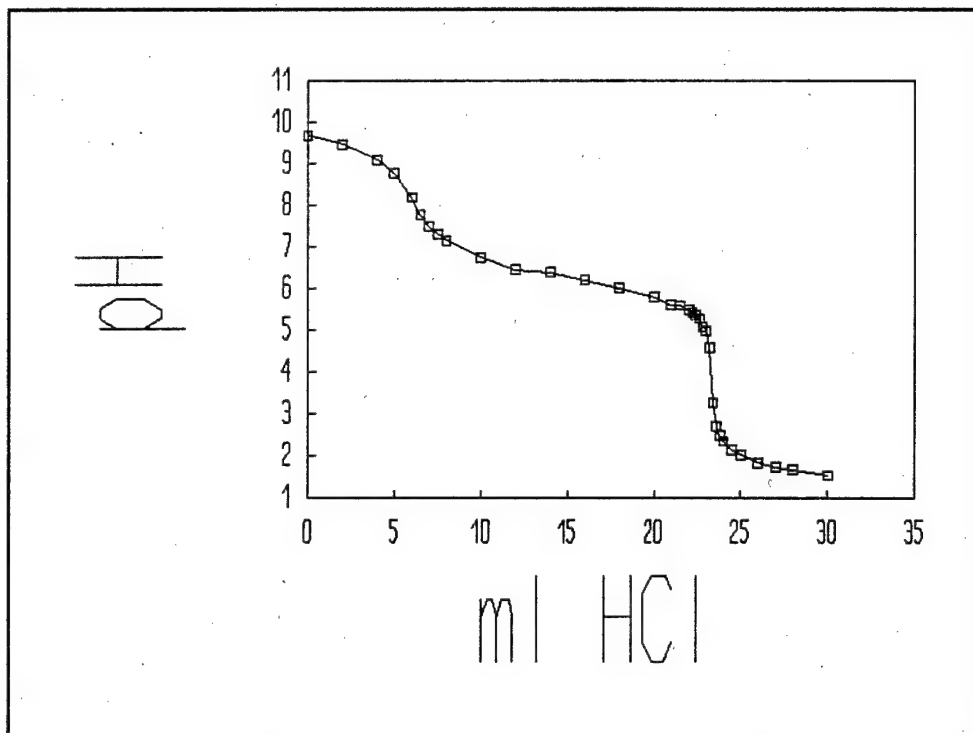


Figure C-46. Curve For The Fourth Titration Of Fresh 250 Micron Sodium Bicarbonate Media With 0.961 M HCl.

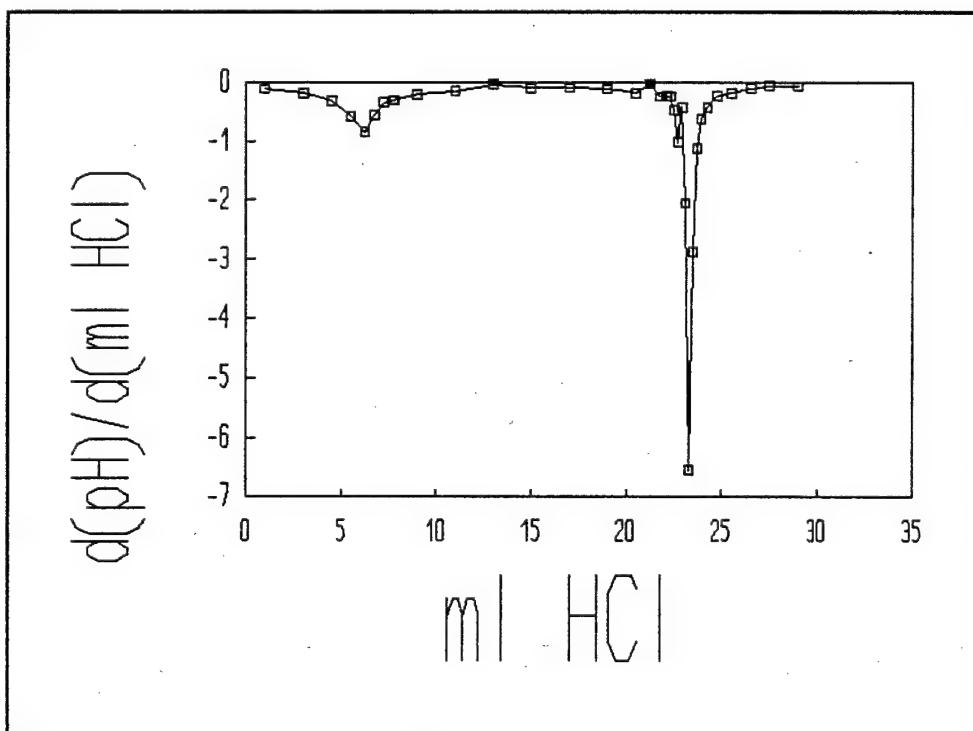


Figure C-47. First Derivative Of The Fourth Titration Curve For Titration Of Fresh 250 Micron Sodium Bicarbonate Media With 0.961 M HCl.

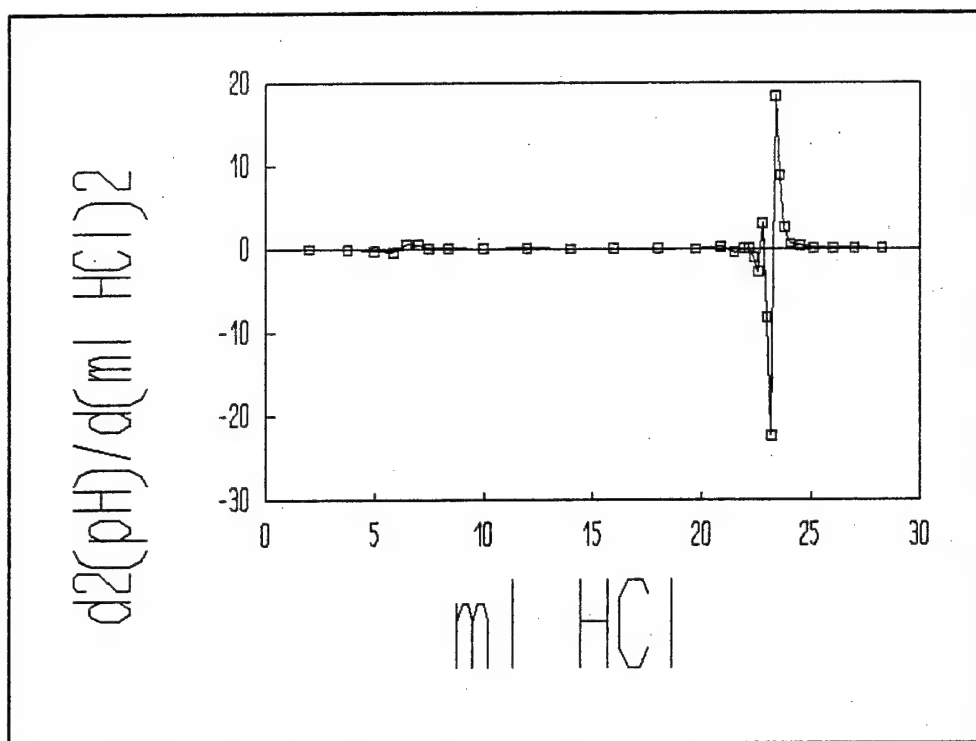


Figure C-48. Second Derivative Of The Fourth Titration Curve For Titration Of Fresh 250 Micron Sodium Bicarbonate Media With 0.961 M HCl.

TABLE 17. FRESH 150 MICRON SODIUM BICARBONATE MEDIA - TITRATION 1.

<u>ml 0.961M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	10.176	1.00	-0.06	2.00	0.02
2.0	10.058	3.00	-0.02	4.00	-0.07
4.0	10.023	5.00	-0.16	6.00	0.02
6.0	9.694	7.00	-0.13	8.00	-0.14
8.0	9.434	9.00	-0.41	9.63	0.20
10.0	8.621	10.25	-0.16	10.50	-3.34
10.5	8.541	10.75	-1.83	11.00	3.13
11.0	7.627	11.25	-0.26	11.50	-0.09
11.5	7.496	11.75	-0.31	12.13	-0.04
12.0	7.342	12.50	-0.34	13.25	0.11
13.0	7.006	14.00	-0.17	15.00	0.02
15.0	6.661	16.00	-0.13	17.00	0.01
17.0	6.400	18.00	-0.11	19.00	-0.00
19.0	6.186	20.00	-0.11	20.75	0.00
21.0	5.964	21.50	-0.11	22.00	-0.03
22.0	5.856	22.50	-0.14	23.00	-0.07
23.0	5.713	23.50	-0.21	23.88	0.05
24.0	5.504	24.25	-0.17	24.50	-0.73
24.5	5.418	24.75	-0.54	24.93	-1.28
25.0	5.150	25.10	-0.98	25.20	-2.78
25.2	4.953	25.30	-1.54	25.40	-19.37
25.4	4.645	25.50	-5.41	25.60	9.10
25.6	3.562	25.70	-3.60	25.80	12.98
25.8	2.843	25.90	-1.00	26.08	0.59
26.0	2.643	26.25	-0.79	26.50	1.02
26.5	2.246	26.75	-0.28	27.13	0.11
27.0	2.104	27.50	-0.20	28.00	0.07
28.0	1.903	28.50	-0.13	29.00	0.04
29.0	1.777	29.50	-0.08	22.25	-0.01
30.0	1.695	15.00	0.06	7.50	0.00

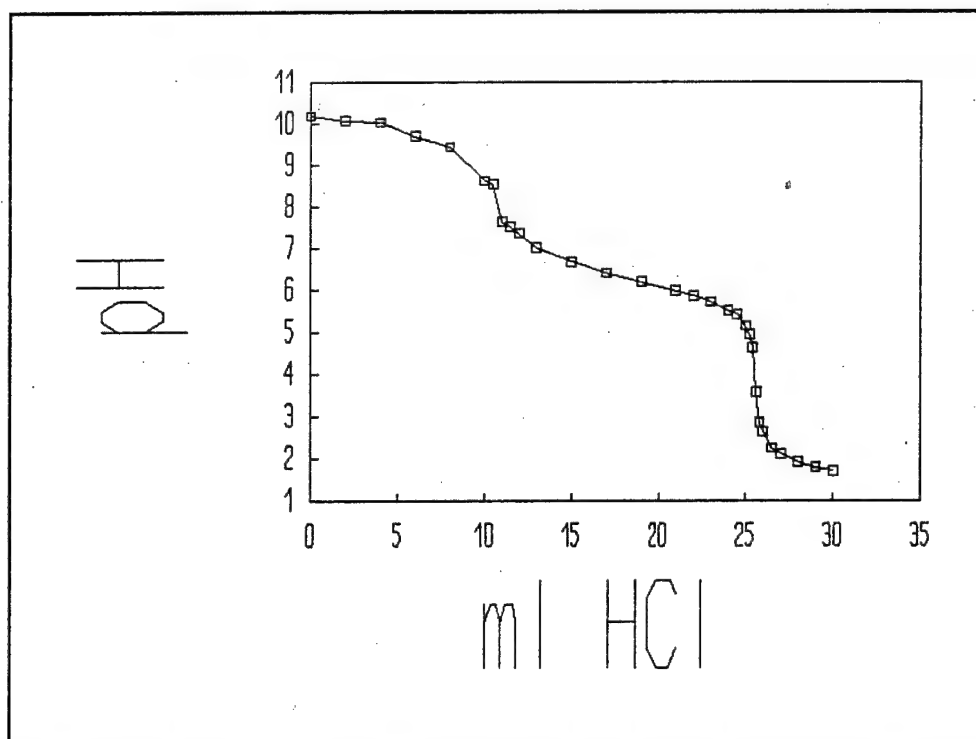


Figure C-49. Curve For The First Titration Of Fresh 150 Micron Sodium Bicarbonate Media With 0.961 M HCl.

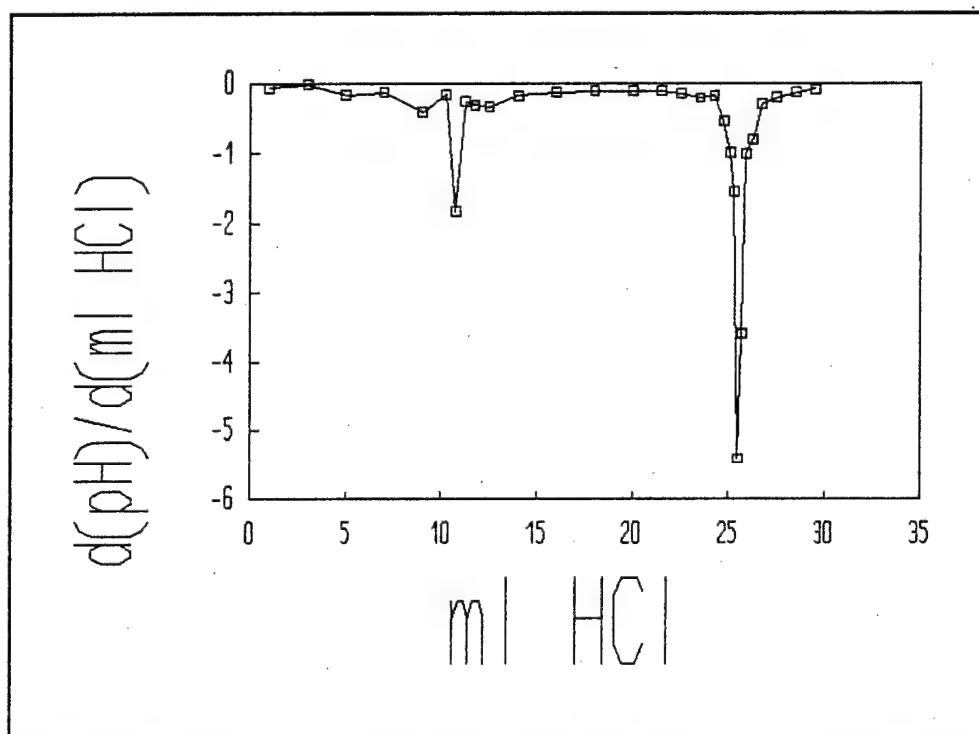


Figure C-50. First Derivative Of The First Titration Curve For Titration Of Fresh 150 Micron Sodium Bicarbonate Media With 0.961 M HCl.

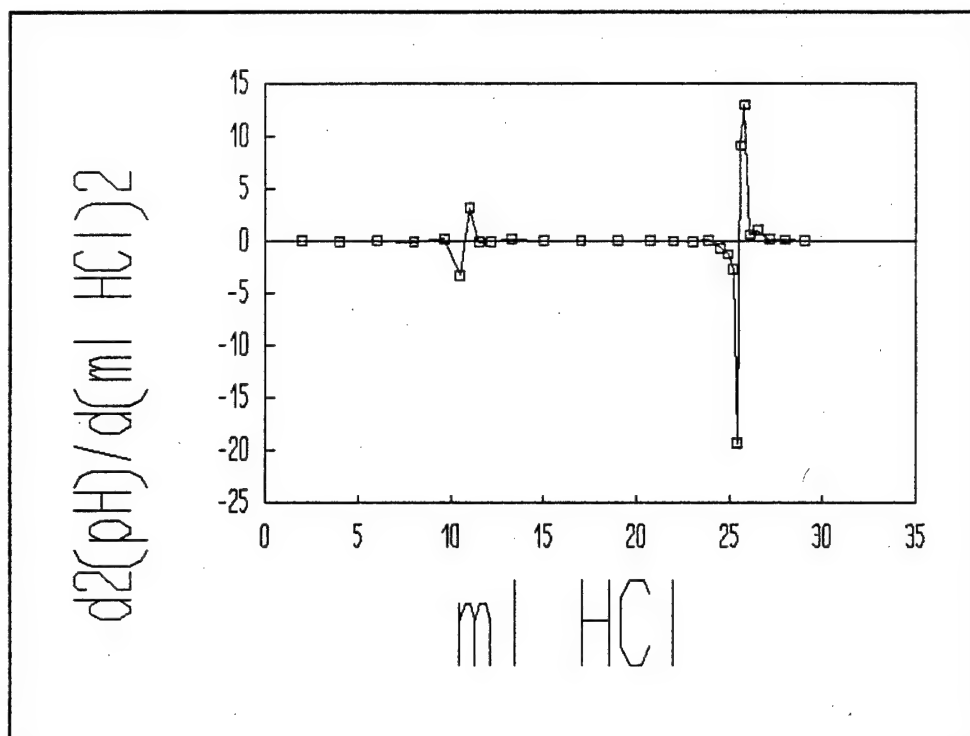


Figure C-51. Second Derivative Of The First Titration Curve For Titration Of Fresh 150 Micron Sodium Bicarbonate Media With 0.961 M HCl.

TABLE 18. FRESH 150 MICRON SODIUM BICARBONATE MEDIA - TITRATION 2.

<u>ml 0.961M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	10.351	1.00	-0.16	2.00	0.01
2.0	10.036	3.00	-0.14	4.00	-0.00
4.0	9.758	5.00	-0.14	6.00	-0.03
6.0	9.471	7.00	-0.20	8.00	-0.14
8.0	9.062	9.00	-0.49	9.63	-0.21
10.0	8.089	10.25	-0.75	10.50	0.43
10.5	7.715	10.75	-0.53	11.00	0.34
11.0	7.448	11.25	-0.36	11.50	0.19
11.5	7.267	11.75	-0.27	12.13	0.11
12.0	7.134	12.50	-0.18	13.25	0.02
13.0	6.950	14.00	-0.15	15.00	0.02
15.0	6.655	16.00	-0.11	17.00	0.01
17.0	6.434	18.00	-0.10	19.00	-0.01
19.0	6.234	20.00	-0.13	20.75	-0.01
21.0	5.981	21.50	-0.14	22.00	-0.06
22.0	5.838	22.50	-0.20	23.00	-0.24
23.0	5.633	23.50	-0.44	23.83	-0.74
24.0	5.190	24.15	-0.92	24.28	-2.57
24.3	4.913	24.40	-1.56	24.50	-23.37
24.5	4.600	24.60	-6.24	24.73	16.95
24.7	3.352	24.85	-2.00	25.00	3.42
25.0	2.751	25.15	-0.98	25.30	1.12
25.3	2.458	25.45	-0.64	25.63	0.64
25.6	2.266	25.80	-0.42	26.03	0.44
26.0	2.100	26.25	-0.22	26.50	0.03
26.5	1.991	26.75	-0.20	27.13	0.10
27.0	1.889	27.50	-0.13	28.00	0.05
28.0	1.759	28.50	-0.08	29.00	0.01
29.0	1.680	29.50	-0.07	22.25	-0.01
30.0	1.609	15.00	0.05	7.50	0.00

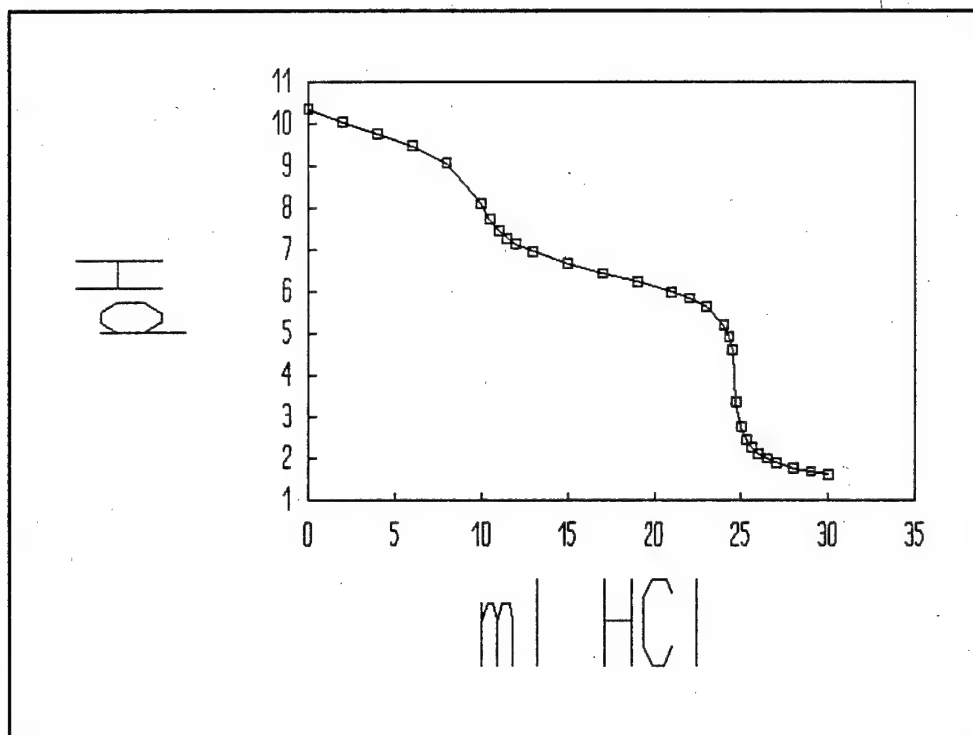


Figure C-52. Curve For The Second Titration Of Fresh 150 Micron Sodium Bicarbonate Media With 0.961 M HCl.

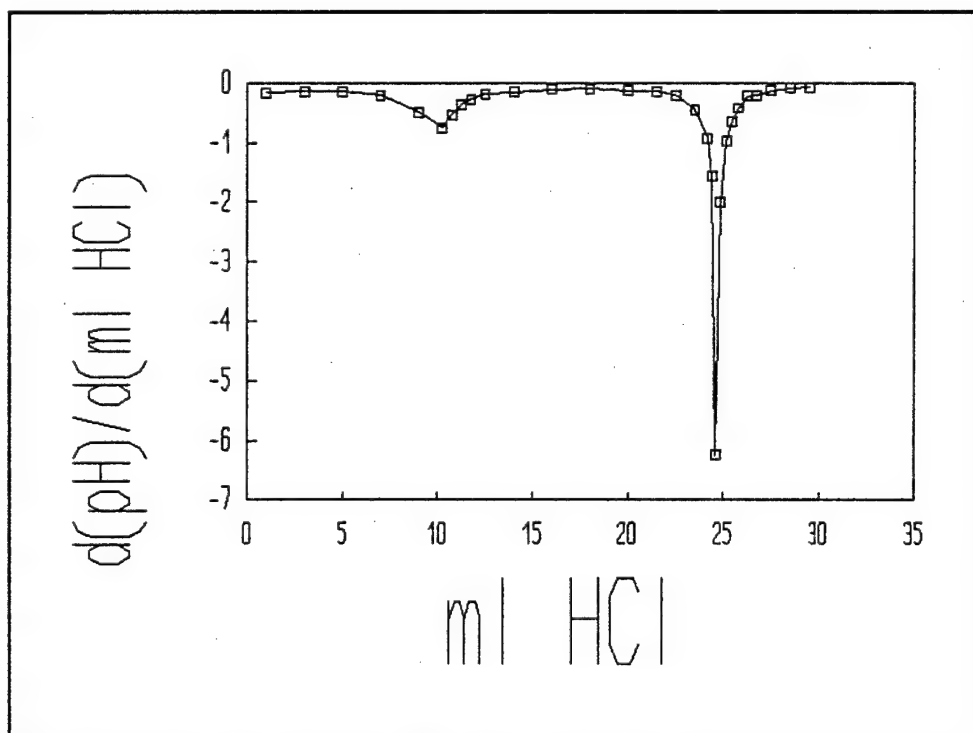


Figure C-53. First Derivative Of The Second Titration Curve For Titration Of Fresh 150 Micron Sodium Bicarbonate Media With 0.961 M HCl.

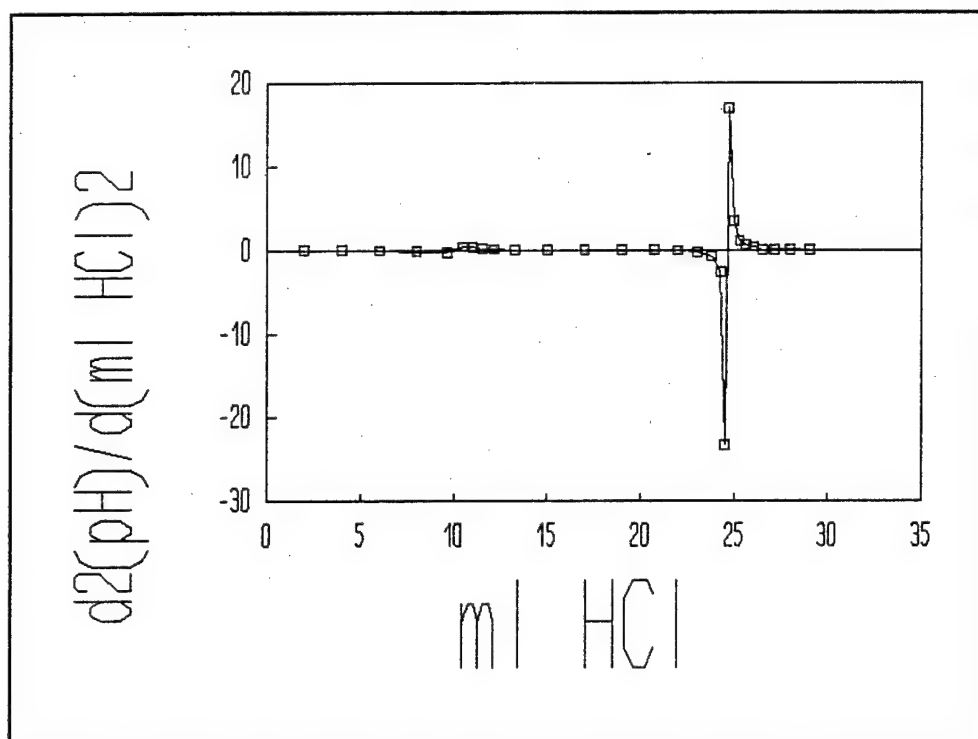


Figure C-54. Second Derivative Of The Second Titration Curve For Titration Of Fresh 150 Micron Sodium Bicarbonate Media With 0.961 M HCl.

TABLE 19. FRESH 150 MICRON SODIUM BICARBONATE MEDIA - TITRATION 3.

<u>ml 0.961M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	10.459	1.00	-0.17	2.00	0.01
2.0	10.118	3.00	-0.15	4.00	-0.00
4.0	9.818	5.00	-0.15	6.00	-0.03
6.0	9.510	7.00	-0.20	7.75	-0.13
8.0	9.100	8.50	-0.40	8.88	-0.14
9.0	8.700	9.25	-0.50	9.50	-0.97
9.5	8.449	9.75	-0.99	10.00	0.40
10.0	7.956	10.25	-0.79	10.50	0.68
10.5	7.562	10.75	-0.45	11.00	0.27
11.0	7.339	11.25	-0.31	11.50	0.01
11.5	7.184	11.75	-0.30	12.13	0.18
12.0	7.032	12.50	-0.17	13.25	0.02
13.0	6.863	14.00	-0.14	15.00	0.02
15.0	6.578	16.00	-0.10	17.00	0.01
17.0	6.369	18.00	-0.08	19.00	-0.00
19.0	6.210	20.00	-0.08	20.75	-0.01
21.0	6.042	21.50	-0.09	22.00	-0.04
22.0	5.948	22.50	-0.13	22.88	-0.10
23.0	5.816	23.25	-0.21	23.50	0.23
23.5	5.713	23.75	-0.09	23.93	-0.36
24.0	5.668	24.10	-0.21	24.23	-0.06
24.2	5.625	24.35	-0.23	24.50	-0.58
24.5	5.556	24.65	-0.40	24.78	-1.01
24.8	5.435	24.90	-0.65	25.00	0.80
25.0	5.304	25.10	-0.49	25.20	-3.83
25.2	5.205	25.30	-1.26	25.40	-6.45
25.4	4.953	25.50	-2.55	25.60	-21.25
25.6	4.443	25.70	-6.80	25.80	24.78
25.8	3.083	25.90	-1.84	26.08	2.76
26.0	2.714	26.25	-0.88	26.50	1.06
26.5	2.274	26.75	-0.35	27.13	0.21
27.0	2.100	27.50	-0.19	28.00	0.06
28.0	1.910	28.50	-0.13	29.00	0.03
29.0	1.785	29.50	-0.09	22.25	-0.01
30.0	1.694	15.00	0.06	7.50	0.00

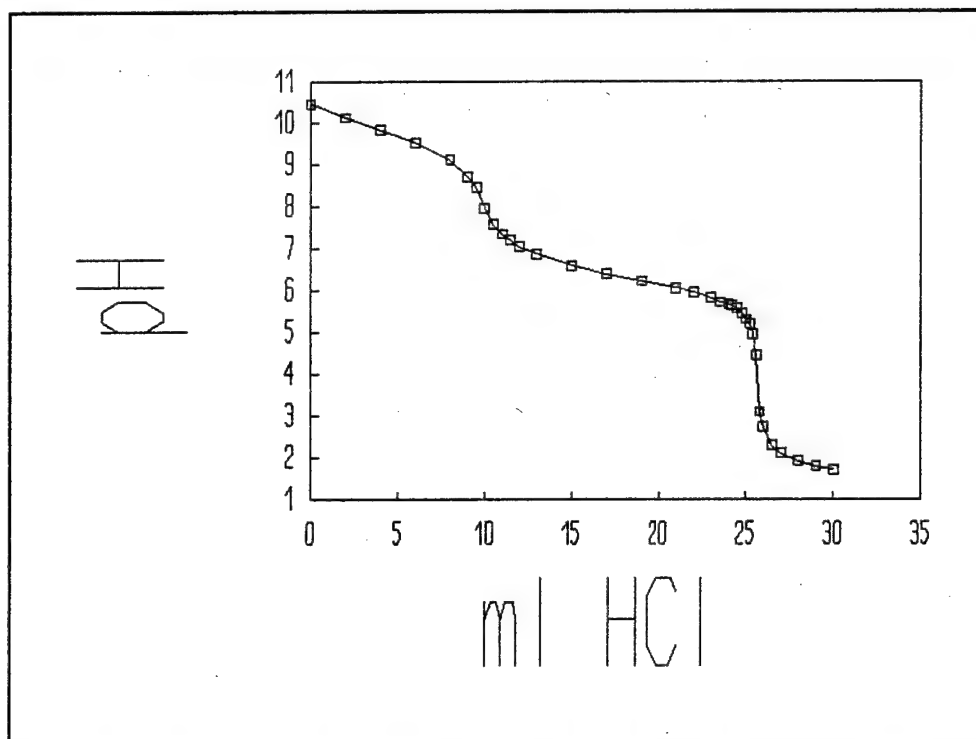


Figure C-55. Curve For The Third Titration Of Fresh 150 Micron Sodium Bicarbonate Media With 0.961 M HCl.

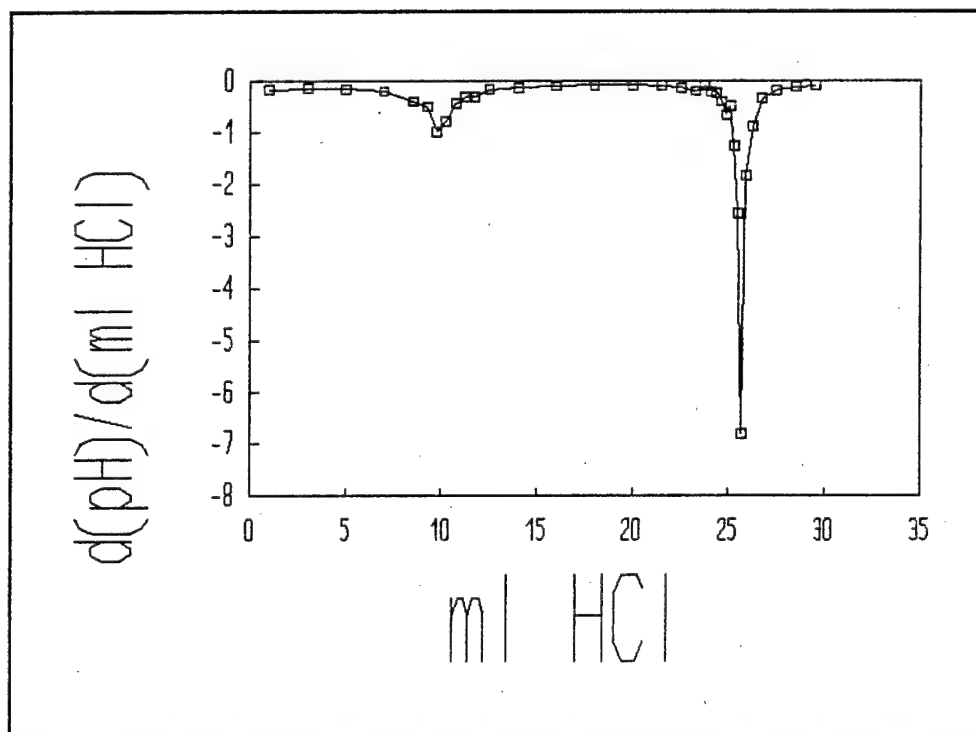


Figure C-56. First Derivative Of The Third Titration Curve For Titration Of Fresh 150 Micron Sodium Bicarbonate Media With 0.961 M HCl.

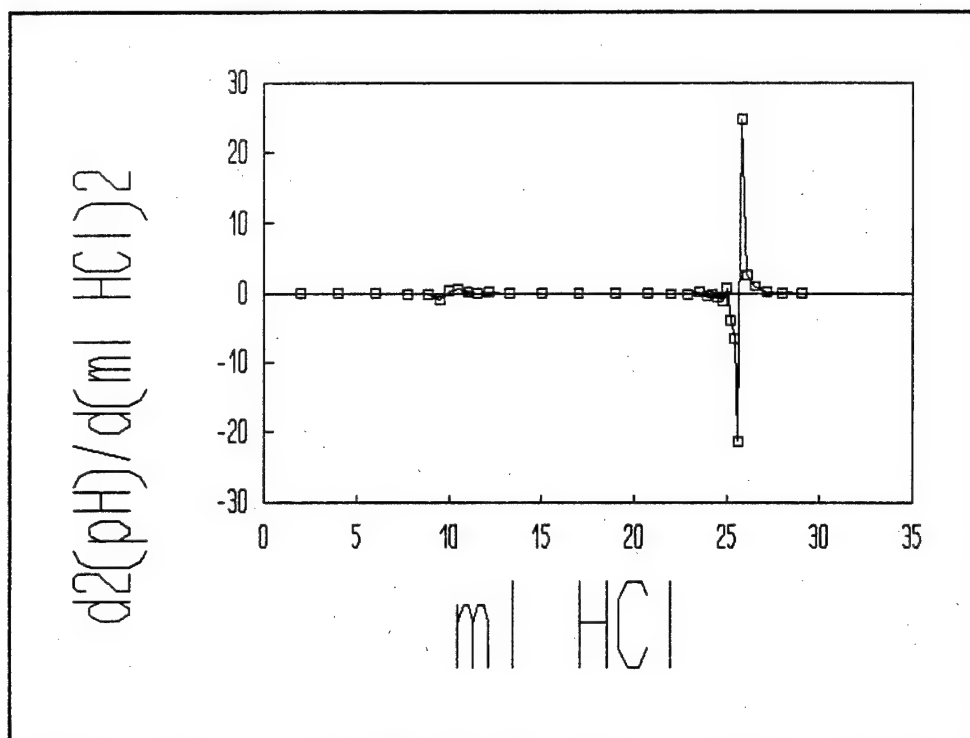


Figure C-57. Second Derivative Of The Third Titration Curve For Titration Of Fresh 150 Micron Sodium Bicarbonate Media With 0.961 M HCl.

TABLE 20. FRESH 150 MICRON SODIUM BICARBONATE MEDIA - TITRATION 4.

<u>ml 0.961M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	10.384	1.00	-0.14	2.00	-0.00
2.0	10.095	3.00	-0.15	4.00	0.00
4.0	9.801	5.00	-0.14	6.00	-0.03
6.0	9.511	7.00	-0.20	7.75	-0.13
8.0	9.106	8.50	-0.40	8.88	-0.49
9.0	8.703	9.25	-0.77	9.50	-0.34
9.5	8.319	9.75	-0.94	10.00	0.62
10.0	7.849	10.25	-0.63	10.50	0.34
10.5	7.534	10.75	-0.46	11.00	0.35
11.0	7.304	11.25	-0.29	11.50	0.10
11.5	7.161	11.75	-0.24	12.13	0.07
12.0	7.042	12.50	-0.18	13.25	0.03
13.0	6.860	14.00	-0.14	15.00	0.02
15.0	6.572	16.00	-0.10	17.00	0.00
17.0	6.376	18.00	-0.10	19.00	-0.00
19.0	6.186	20.00	-0.10	20.75	-0.01
21.0	5.992	21.50	-0.11	21.88	-0.01
22.0	5.884	22.25	-0.11	22.50	-0.11
22.5	5.827	22.75	-0.17	23.00	-0.07
23.0	5.742	23.25	-0.21	23.50	-0.13
23.5	5.639	23.75	-0.27	23.93	-0.32
24.0	5.503	24.10	-0.38	24.20	1.00
24.2	5.426	24.30	-0.19	24.40	-0.65
24.4	5.389	24.50	-0.31	24.60	-1.00
24.6	5.326	24.70	-0.52	24.80	-3.90
24.8	5.223	24.90	-1.29	25.00	-6.75
25.0	4.964	25.10	-2.64	25.20	-19.03
25.2	4.435	25.30	-6.45	25.40	20.75
25.4	3.145	25.50	-2.30	25.60	8.70
25.6	2.685	25.70	-0.56	25.80	-2.17
25.8	2.573	25.90	-0.99	26.08	1.68
26.0	2.374	26.25	-0.41	26.50	0.25
26.5	2.170	26.75	-0.28	27.13	0.14
27.0	2.028	27.50	-0.18	28.00	0.07
28.0	1.852	28.50	-0.10	29.00	0.02
29.0	1.749	29.50	-0.08	22.25	-0.01
30.0	1.669	15.00	0.06	7.50	0.00

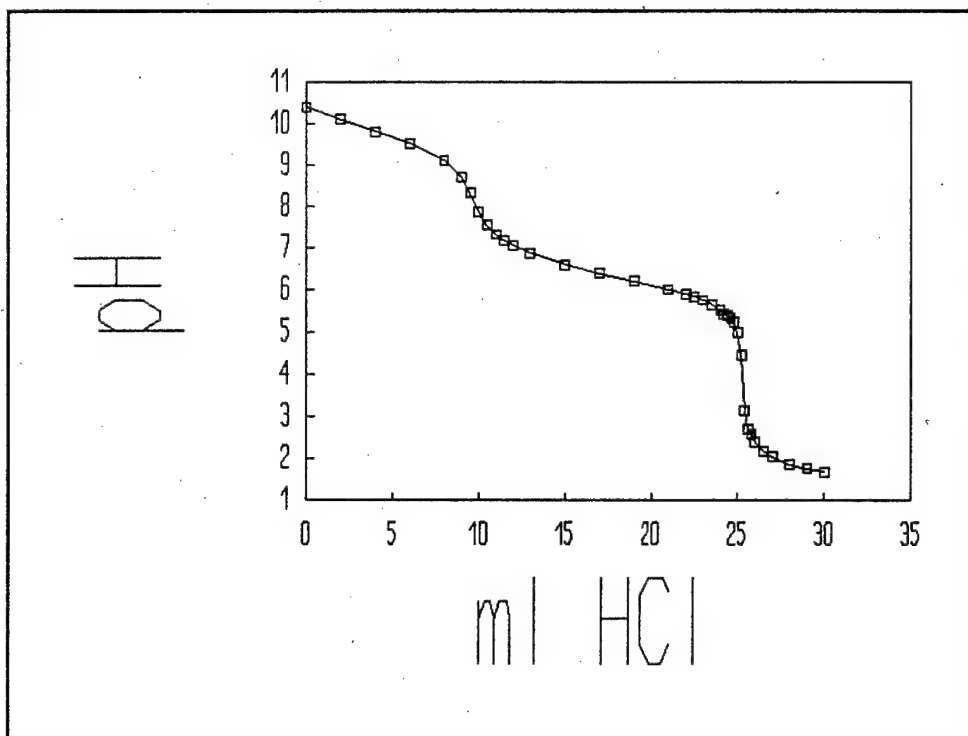


Figure C-58. Curve For The Fourth Titration Of Fresh 150 Micron Sodium Bicarbonate Media With 0.961 M HCl.

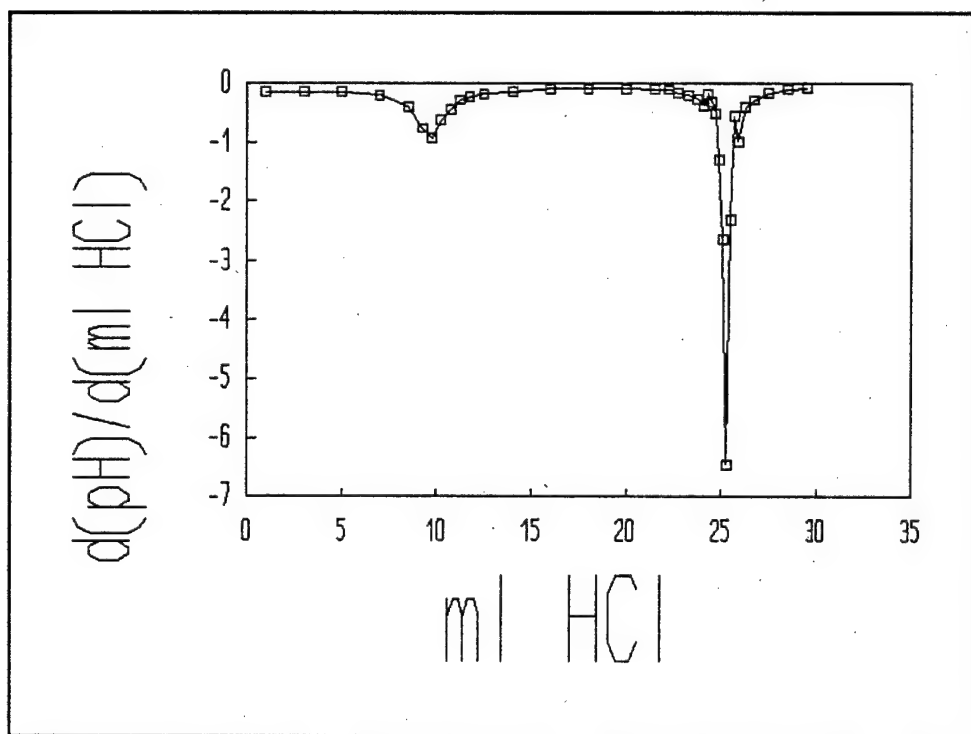


Figure C-59. First Derivative Of The Fourth Titration Curve For Titration Of Fresh 150 Micron Sodium Bicarbonate Media With 0.961 M HCl.

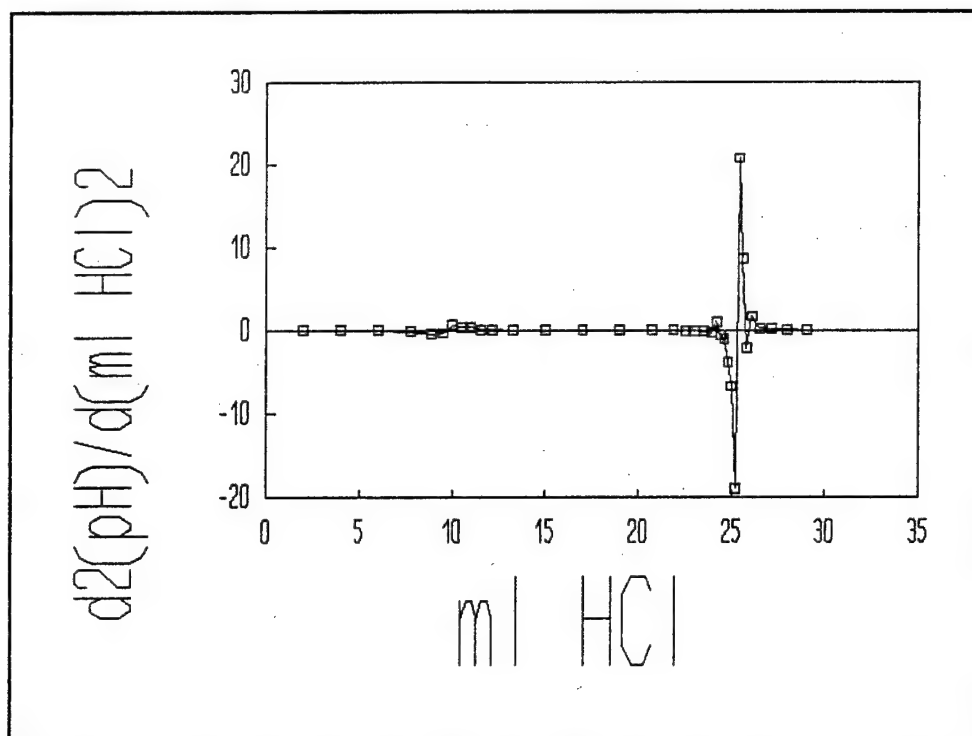


Figure C-60. Second Derivative Of The Fourth Titration Curve For Titration Of Fresh 150 Micron Sodium Bicarbonate Media With 0.961 M HCl.

TABLE 21. FRESH 106 MICRON SODIUM BICARBONATE MEDIA - TITRATION 1.

<u>ml 0.961M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d²(pH)/d(ml)²</u>
0.0	10.704	1.00	-0.17	2.00	0.03
2.0	10.358	3.00	-0.12	4.00	-0.01
4.0	10.114	5.00	-0.14	6.00	0.00
6.0	9.840	7.00	-0.13	8.00	-0.02
8.0	9.584	9.00	-0.16	9.75	-0.05
10.0	9.266	10.50	-0.23	10.88	-0.07
11.0	9.036	11.25	-0.28	11.50	-0.22
11.5	8.895	11.75	-0.39	12.00	-0.41
12.0	8.699	12.25	-0.60	12.50	-0.22
12.5	8.400	12.75	-0.71	13.38	0.19
13.0	8.046	14.00	-0.47	15.00	0.15
15.0	7.098	16.00	-0.18	17.00	0.03
17.0	6.732	18.00	-0.11	19.00	0.00
19.0	6.505	20.00	-0.11	21.00	0.00
21.0	6.285	22.00	-0.10	22.75	0.01
23.0	6.077	23.50	-0.10	24.00	-0.02
24.0	5.981	24.50	-0.11	24.88	0.02
25.0	5.870	25.25	-0.10	25.50	-0.13
25.5	5.822	25.75	-0.16	26.00	-0.05
26.0	5.741	26.25	-0.19	26.50	0.01
26.5	5.647	26.75	-0.18	26.95	-0.13
27.0	5.556	27.15	-0.23	27.28	-0.59
27.3	5.486	27.40	-0.38	27.53	-0.51
27.5	5.410	27.65	-0.51	27.78	-0.89
27.8	5.258	27.90	-0.73	28.00	-1.07
28.0	5.112	28.10	-0.94	28.20	-8.78
28.2	4.923	28.30	-2.70	28.40	-12.42
28.4	4.383	28.50	-5.18	28.60	11.92
28.6	3.346	28.70	-2.80	28.80	7.73
28.8	2.786	28.90	-1.25	29.08	1.74
29.0	2.535	29.25	-0.65	29.50	0.76
29.5	2.212	29.75	-0.27	30.13	0.10
30.0	2.079	30.50	-0.19	31.00	0.07
31.0	1.887	31.50	-0.12	32.25	0.03
32.0	1.767	33.00	-0.07	33.75	0.00
34.0	1.624	34.50	-0.06	26.00	-0.01
35.0	1.560	17.50	0.04	8.75	0.00

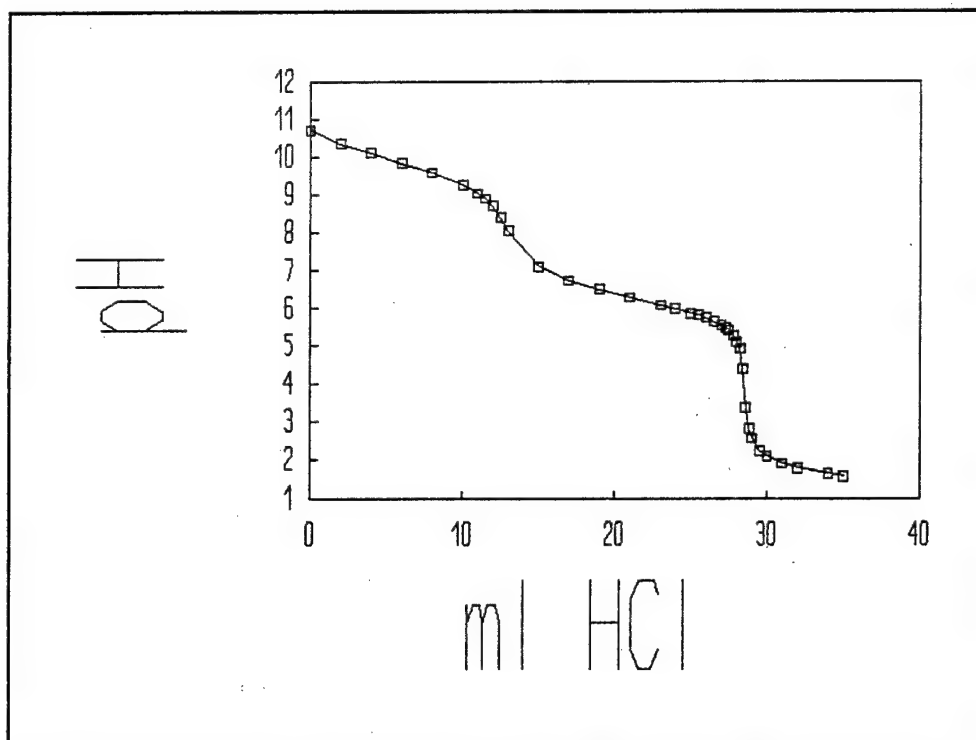


Figure C-61. Curve For The First Titration Of Fresh 106 Micron Sodium Bicarbonate Media With 0.961 M HCl.

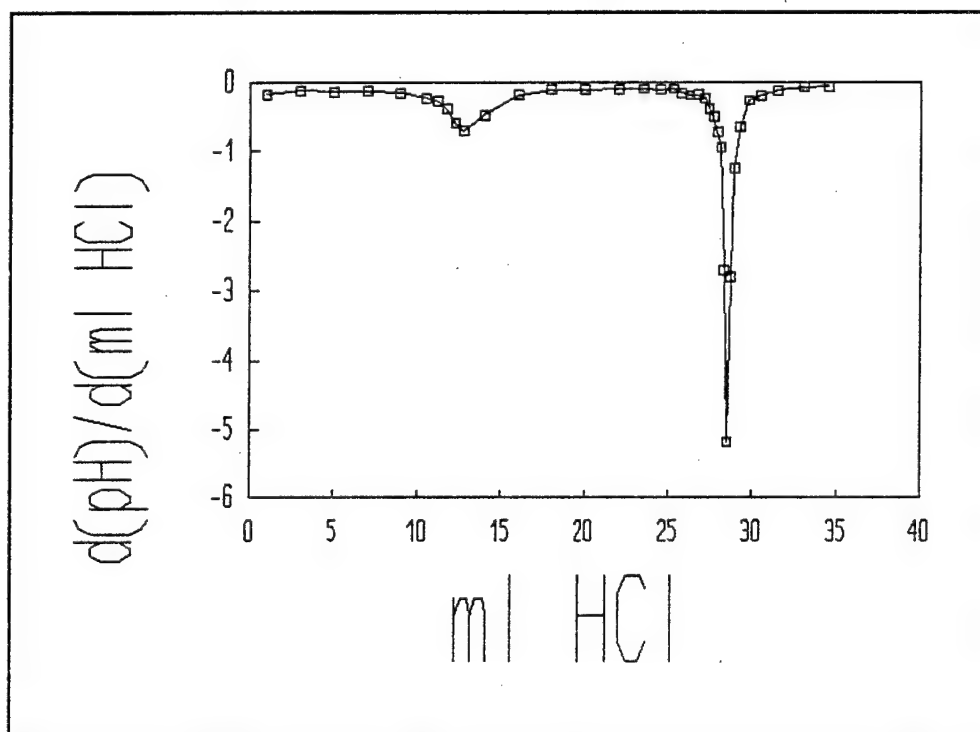


Figure C-62. First Derivative Of The First Titration Curve For Titration Of Fresh 106 Micron Sodium Bicarbonate Media With 0.961 M HCl.

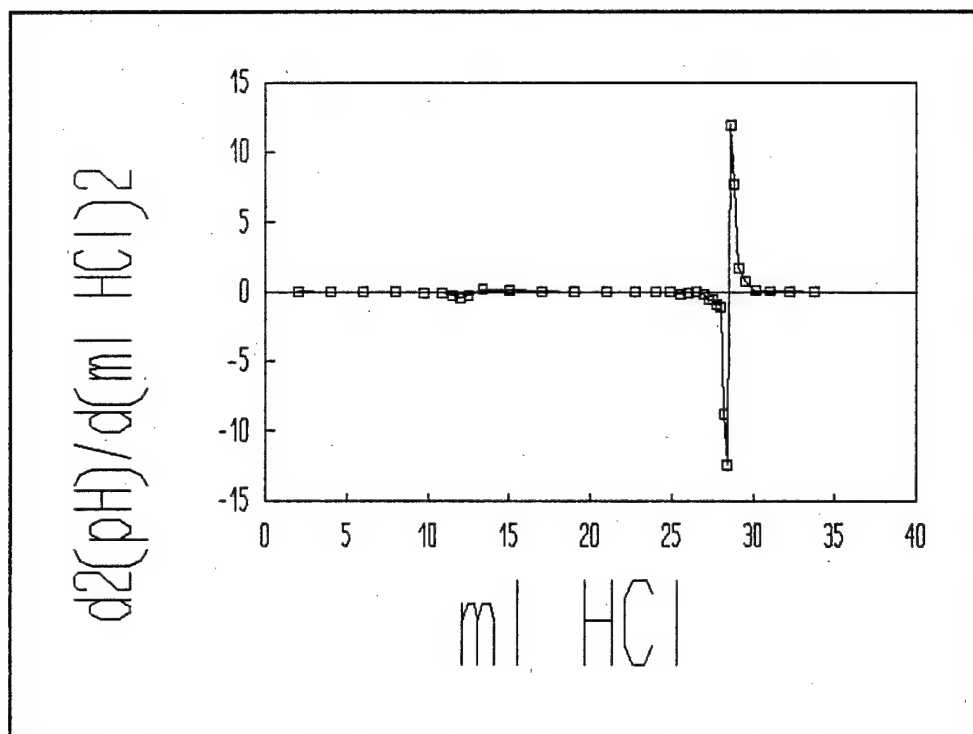


Figure C-63. Second Derivative Of The First Titration Curve For Titration Of Fresh 106 Micron Sodium Bicarbonate Media With 0.961 M HCl.

TABLE 22. FRESH 106 MICRON SODIUM BICARBONATE MEDIA - TITRATION 2.

<u>ml 0.961M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	10.719	1.00	-0.20	2.00	0.02
2.0	10.321	3.00	-0.16	4.00	0.03
4.0	10.003	5.00	-0.10	6.00	-0.01
6.0	9.810	7.00	-0.12	8.00	-0.00
8.0	9.570	9.00	-0.13	9.75	-0.03
10.0	9.312	10.50	-0.17	10.88	-0.10
11.0	9.143	11.25	-0.24	11.50	0.09
11.5	9.021	11.75	-0.20	12.00	-0.35
12.0	8.922	12.25	-0.37	12.50	-0.17
12.5	8.736	12.75	-0.46	13.00	-0.29
13.0	8.508	13.25	-0.60	13.50	-0.47
13.5	8.208	13.75	-0.83	14.00	0.52
14.0	7.791	14.25	-0.58	14.50	0.46
14.5	7.503	14.75	-0.34	15.00	0.07
15.0	7.331	15.25	-0.31	15.50	0.16
15.5	7.176	15.75	-0.23	16.38	0.04
16.0	7.062	17.00	-0.18	18.00	0.03
18.0	6.704	19.00	-0.12	20.00	0.01
20.0	6.474	21.00	-0.10	22.00	-0.00
22.0	6.273	23.00	-0.10	23.75	-0.00
24.0	6.071	24.50	-0.11	25.00	-0.03
25.0	5.964	25.50	-0.13	25.88	0.02
26.0	5.832	26.25	-0.12	26.50	-0.07
26.5	5.772	26.75	-0.16	27.00	0.13
27.0	5.694	27.25	-0.09	27.50	-0.35
27.5	5.648	27.75	-0.27	28.00	-0.28
28.0	5.514	28.25	-0.41	28.43	-0.60
28.5	5.309	28.60	-0.62	28.73	-3.13
28.7	5.185	28.85	-1.40	29.00	-12.39
29.0	4.764	29.15	-5.12	29.28	12.30
29.3	3.228	29.40	-2.04	29.50	4.07
29.5	2.819	29.60	-1.23	29.73	1.89
29.7	2.573	29.85	-0.76	30.05	0.88
30.0	2.346	30.25	-0.40	30.50	0.27
30.5	2.144	30.75	-0.27	31.13	0.15
31.0	2.010	31.50	-0.16	32.00	0.05
32.0	1.853	32.50	-0.10	33.00	0.03
33.0	1.749	33.50	-0.08	34.00	0.01
34.0	1.671	34.50	-0.07	26.00	-0.01
35.0	1.600	17.50	0.05	8.75	0.00

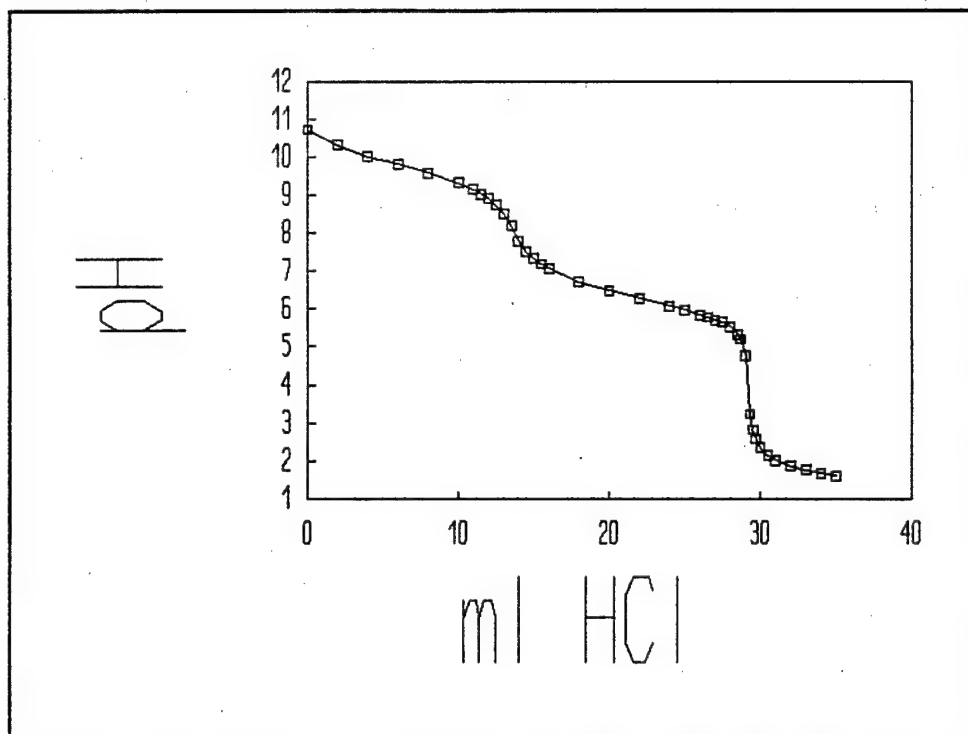


Figure C-64. Curve For The Second Titration Of Fresh 106 Micron Sodium Bicarbonate Media With 0.961 M HCl.

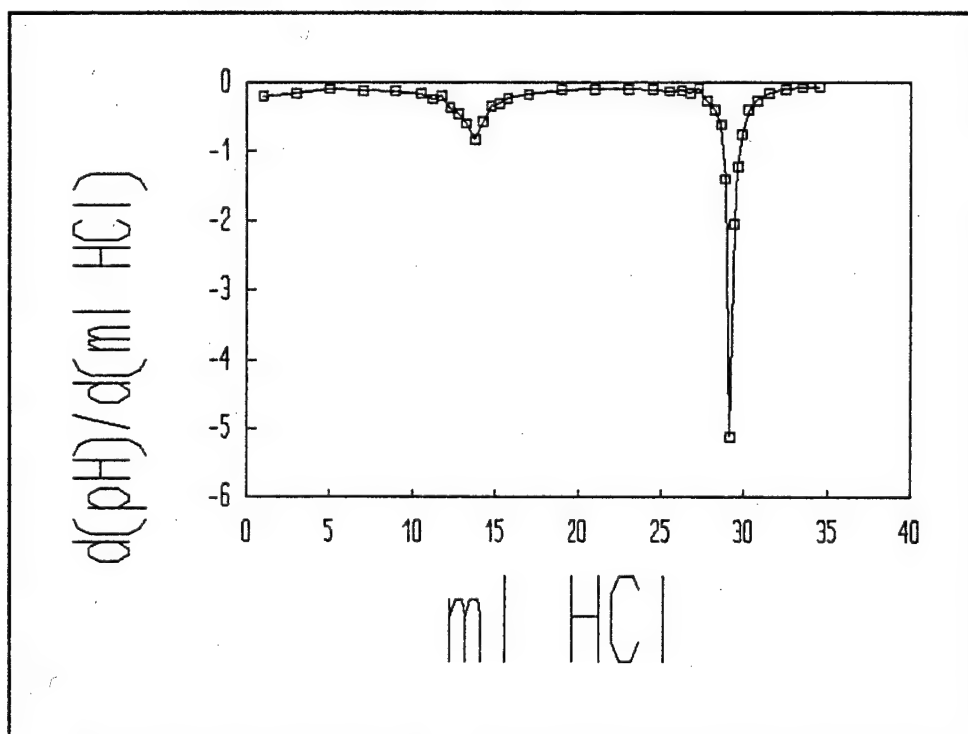


Figure C-65. First Derivative Of The Second Titration Curve For Titration Of Fresh 106 Micron Sodium Bicarbonate Media With 0.961 M HCl.

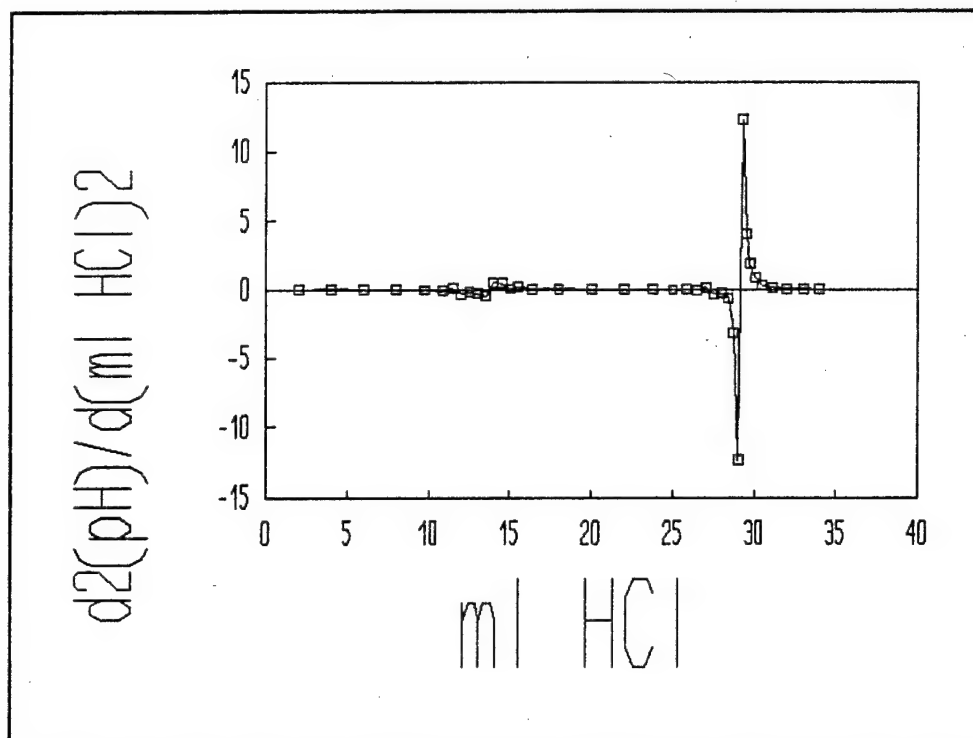


Figure C-66. Second Derivative Of The Second Titration Curve For Titration Of Fresh 106 Micron Sodium Bicarbonate Media With 0.961 M HCl.

TABLE 23. FRESH 106 MICRON SODIUM BICARBONATE MEDIA - TITRATION 3.

<u>ml 0.961M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	10.739	1.00	-0.17	2.00	0.03
2.0	10.390	3.00	-0.12	4.00	-0.01
4.0	10.149	5.00	-0.13	6.00	0.01
6.0	9.881	7.00	-0.12	8.00	-0.01
8.0	9.637	9.00	-0.14	10.00	-0.05
10.0	9.360	11.00	-0.24	11.75	-0.18
12.0	8.889	12.50	-0.50	12.88	-0.54
13.0	8.390	13.25	-0.90	13.50	0.72
13.5	7.939	13.75	-0.54	14.00	0.21
14.0	7.667	14.25	-0.44	14.50	0.21
14.5	7.448	14.75	-0.33	15.13	0.21
15.0	7.281	15.50	-0.18	16.25	-0.01
16.0	7.103	17.00	-0.19	18.00	0.04
18.0	6.724	19.00	-0.11	20.00	0.01
20.0	6.502	21.00	-0.10	22.00	-0.00
22.0	6.309	23.00	-0.10	24.00	-0.01
24.0	6.103	25.00	-0.12	25.75	-0.03
26.0	5.865	26.50	-0.16	26.88	-0.02
27.0	5.700	27.25	-0.18	27.50	-0.12
27.5	5.611	27.75	-0.24	27.95	-0.29
28.0	5.491	28.15	-0.36	28.33	-0.88
28.3	5.384	28.50	-0.66	28.68	-1.66
28.7	5.118	28.85	-1.25	28.98	-16.51
29.0	4.744	29.10	-5.37	29.20	7.42
29.2	3.669	29.30	-3.89	29.40	12.73
29.4	2.891	29.50	-1.34	29.60	2.70
29.6	2.622	29.70	-0.81	29.80	0.68
29.8	2.461	29.90	-0.67	30.08	0.85
30.0	2.327	30.25	-0.37	30.50	0.18
30.5	2.141	30.75	-0.28	31.13	0.18
31.0	2.000	31.50	-0.15	32.00	0.04
32.0	1.851	32.50	-0.11	33.00	0.03
33.0	1.745	33.50	-0.08	34.00	0.01
34.0	1.667	34.50	-0.07	26.00	-0.01
35.0	1.597	17.50	0.05	8.75	0.00

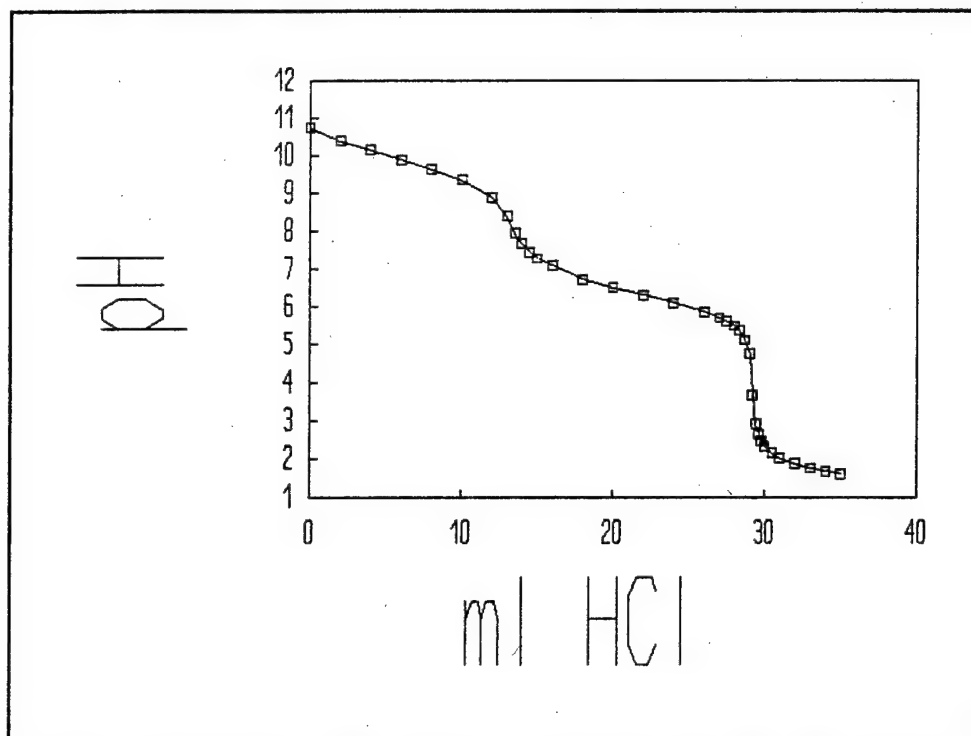


Figure C-67. Curve For The Third Titration Of Fresh 106 Micron Sodium Bicarbonate Media With 0.961 M HCl.

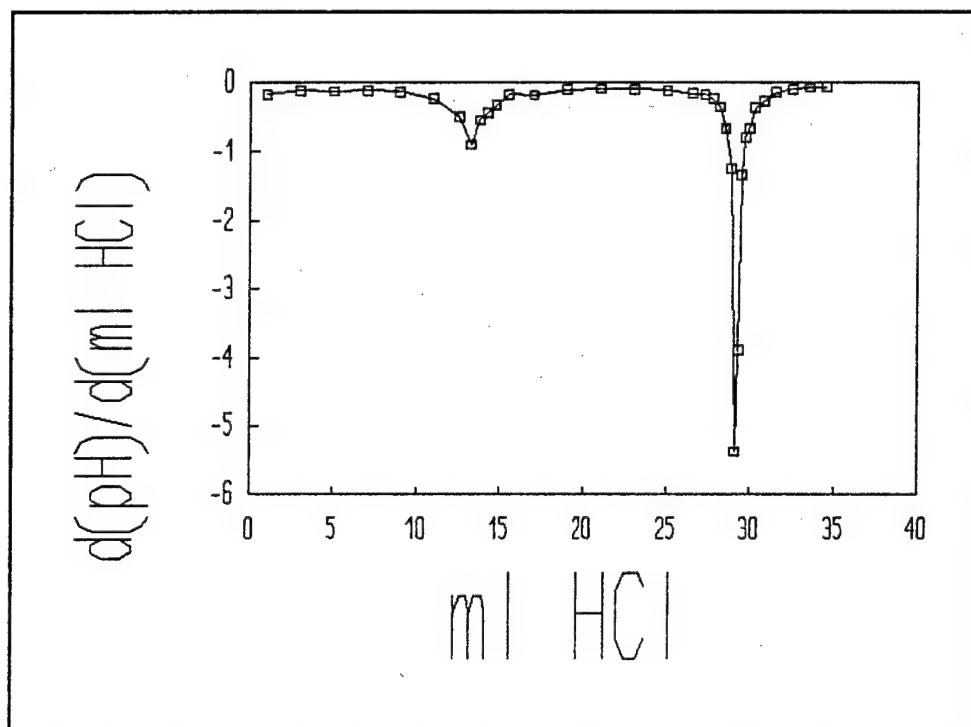


Figure C-68. First Derivative Of The Third Titration Curve For Titration Of Fresh 106 Micron Sodium Bicarbonate Media With 0.961 M HCl.

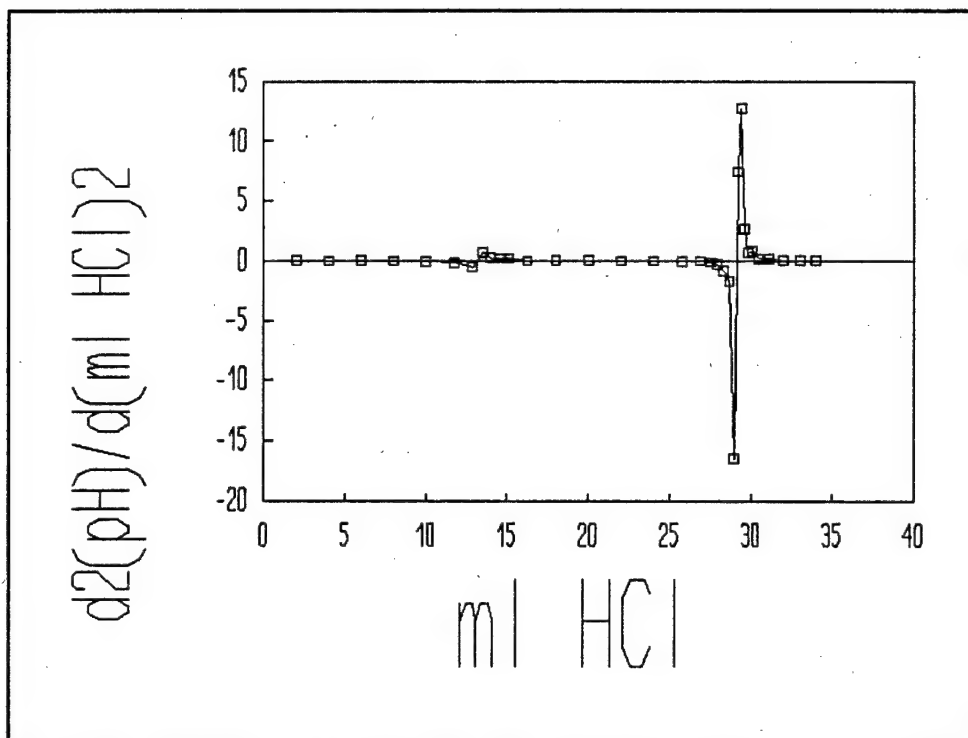


Figure C-69. Second Derivative Of The Third Titration Curve For Titration Of Fresh 106 Micron Sodium Bicarbonate Media With 0.961 M HCl.

TABLE 24. FRESH 106 MICRON SODIUM BICARBONATE MEDIA - TITRATION 4.

<u>ml 0.961M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d²(pH)/d(ml)²</u>
0.0	10.487	1.00	-0.11	2.00	0.01
2.0	10.257	3.00	-0.10	4.00	0.00
4.0	10.050	5.00	-0.10	6.00	-0.00
6.0	9.859	7.00	-0.10	8.00	-0.00
8.0	9.661	9.00	-0.10	10.00	-0.02
10.0	9.455	11.00	-0.15	11.75	-0.03
12.0	9.155	12.50	-0.20	13.00	0.02
13.0	8.955	13.50	-0.18	13.88	-0.30
14.0	8.770	14.25	-0.41	14.50	-0.32
14.5	8.565	14.75	-0.57	15.00	-0.21
15.0	8.280	15.25	-0.68	15.50	-0.44
15.5	7.942	15.75	-0.89	16.00	1.08
16.0	7.495	16.25	-0.36	16.50	0.32
16.5	7.317	16.75	-0.19	17.13	-0.02
17.0	7.220	17.50	-0.21	18.25	0.01
18.0	7.009	19.00	-0.19	20.00	0.03
20.0	6.624	21.00	-0.13	22.00	0.02
22.0	6.369	23.00	-0.10	24.00	-0.01
24.0	6.179	25.00	-0.11	25.75	0.02
26.0	5.957	26.50	-0.09	27.00	-0.11
27.0	5.870	27.50	-0.19	28.00	0.05
28.0	5.676	28.50	-0.15	28.88	-0.00
29.0	5.528	29.25	-0.15	29.50	-0.40
29.5	5.454	29.75	-0.35	29.93	-0.33
30.0	5.280	30.10	-0.46	30.20	-0.83
30.2	5.187	30.30	-0.63	30.40	-3.60
30.4	5.061	30.50	-1.35	30.60	-6.38
30.6	4.791	30.70	-2.63	30.80	-16.72
30.8	4.266	30.90	-5.97	31.00	21.27
31.0	3.072	31.10	-1.71	31.23	2.43
31.2	2.729	31.35	-1.11	31.55	1.46
31.5	2.397	31.75	-0.52	32.13	0.38
32.0	2.135	32.50	-0.24	33.00	0.11
33.0	1.894	33.50	-0.13	34.00	0.02
34.0	1.766	34.50	-0.11	26.00	-0.01
35.0	1.657	17.50	0.05	8.75	0.00

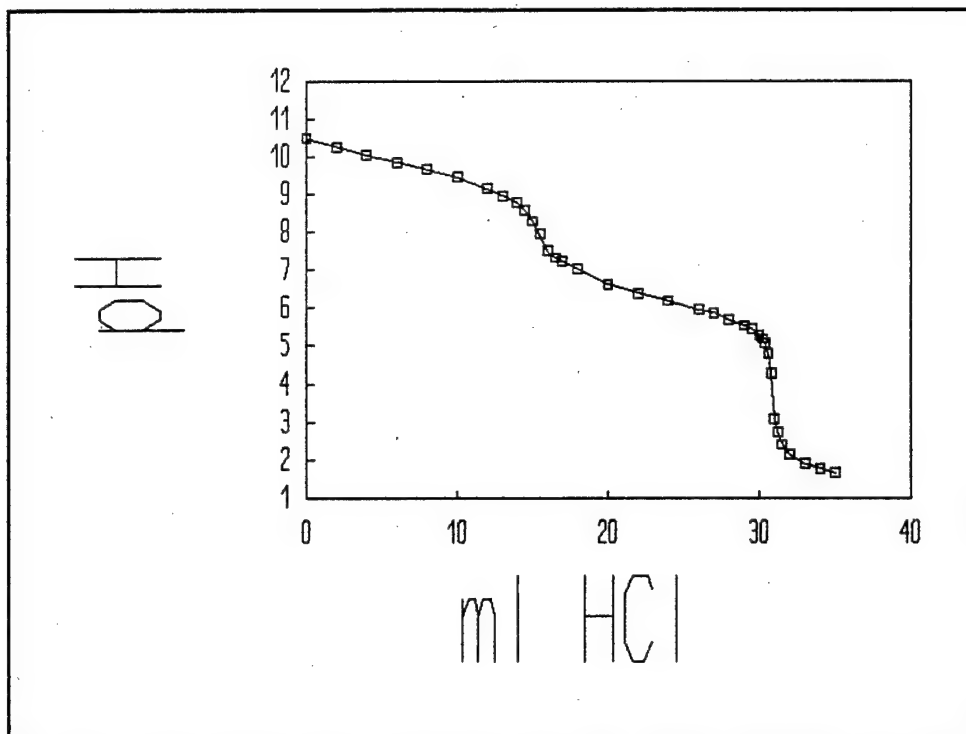


Figure C-70. Curve For The Fourth Titration Of Fresh 106 Micron Sodium Bicarbonate Media With 0.961 M HCl.

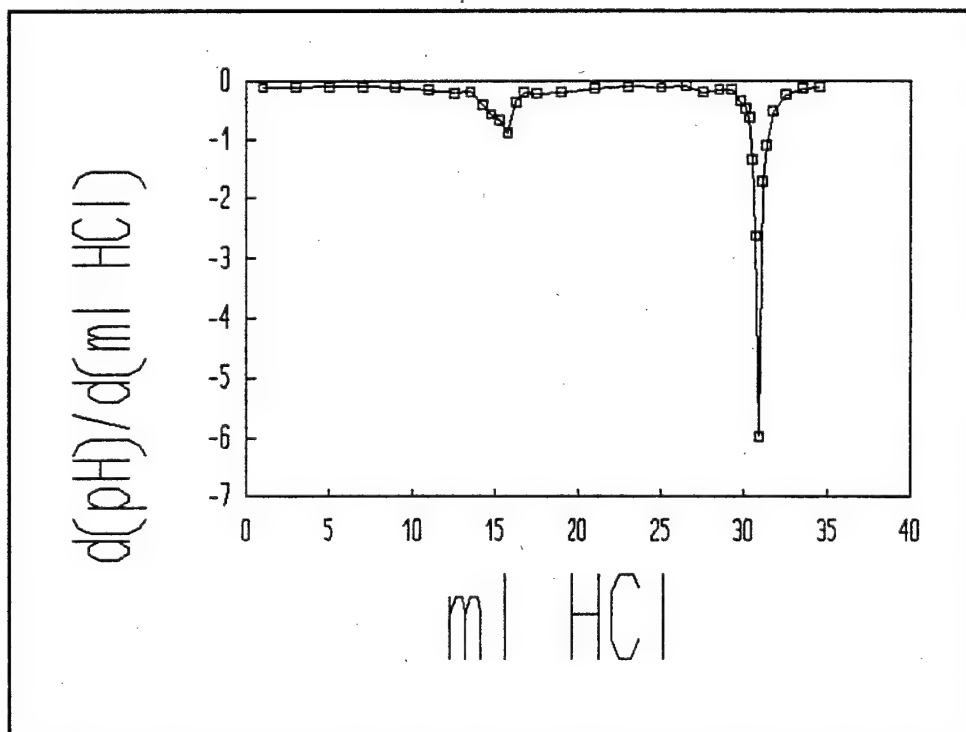


Figure C-71. First Derivative Of The Fourth Titration Curve For Titration Of Fresh 106 Micron Sodium Bicarbonate Media With 0.961 M HCl.

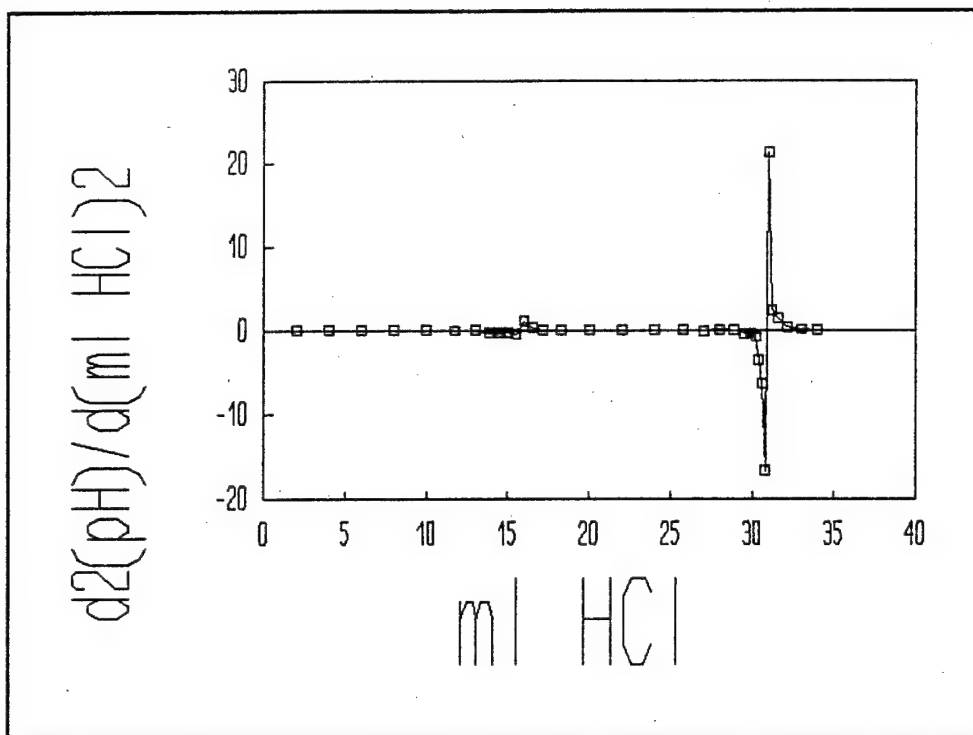


Figure C-72. Second Derivative Of The Fourth Titration Curve For Titration Of Fresh 106 Micron Sodium Bicarbonate Media With 0.961 M HCl.

TABLE 25. FRESH 75 MICRON SODIUM BICARBONATE MEDIA - TITRATION 1.

<u>ml 0.961M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d²(pH)/d(ml)²</u>
0.0	10.135	1.00	-0.09	2.00	-0.01
2.0	9.951	3.00	-0.10	4.00	-0.01
4.0	9.745	5.00	-0.12	6.00	-0.01
6.0	9.512	7.00	-0.13	8.00	-0.06
8.0	9.256	9.00	-0.25	9.63	-0.27
10.0	8.756	10.25	-0.59	10.50	0.04
10.5	8.460	10.75	-0.57	11.00	-0.48
11.0	8.174	11.25	-0.81	11.50	0.47
11.5	7.769	11.75	-0.58	12.00	0.41
12.0	7.481	12.25	-0.37	12.50	0.39
12.5	7.296	12.75	-0.17	13.13	-0.07
13.0	7.209	13.50	-0.23	14.25	0.06
14.0	6.980	15.00	-0.14	16.00	0.03
16.0	6.706	17.00	-0.09	18.00	-0.00
18.0	6.536	19.00	-0.09	20.00	-0.00
20.0	6.364	21.00	-0.09	22.00	-0.00
22.0	6.182	23.00	-0.09	23.75	0.02
24.0	5.993	24.50	-0.06	25.00	-0.01
25.0	5.932	25.50	-0.07	26.00	-0.04
26.0	5.861	26.50	-0.11	26.88	-0.17
27.0	5.755	27.25	-0.23	27.50	-0.09
27.5	5.638	27.75	-0.28	27.95	0.57
28.0	5.498	28.15	-0.05	28.33	-0.42
28.3	5.482	28.50	-0.20	28.68	-0.01
28.7	5.402	28.85	-0.20	28.98	-0.81
29.0	5.341	29.10	-0.40	29.20	-1.50
29.2	5.260	29.30	-0.71	29.40	-0.95
29.4	5.119	29.50	-0.89	29.60	-3.75
29.6	4.940	29.70	-1.65	29.80	-2.15
29.8	4.611	29.90	-2.07	29.97	-40.10
30.0	4.196	30.05	-8.09	30.10	39.30
30.1	3.387	30.15	-4.16	30.25	13.92
30.2	2.971	30.35	-1.38	30.55	1.82
30.5	2.558	30.75	-0.65	31.13	0.53
31.0	2.234	31.50	-0.25	32.00	0.09
32.0	1.982	32.50	-0.16	33.25	0.05
33.0	1.822	34.00	-0.09	25.75	-0.01
35.0	1.649	17.50	0.05	8.75	0.00

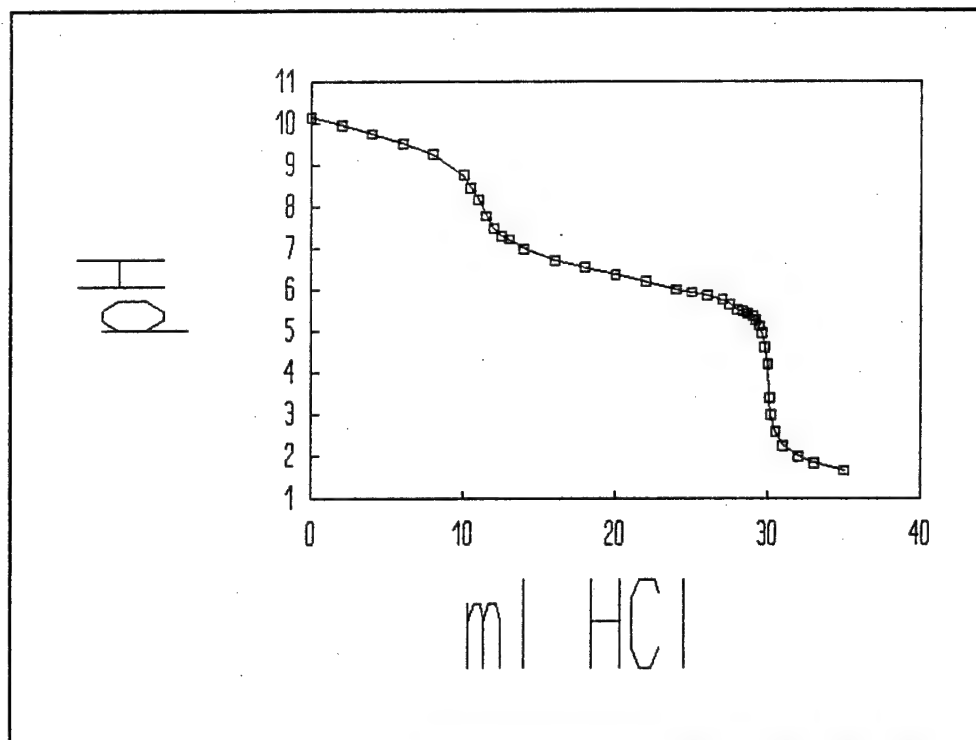


Figure C-73. Curve For The First Titration Of Fresh 75 Micron Sodium Bicarbonate Media With 0.961 M HCl.

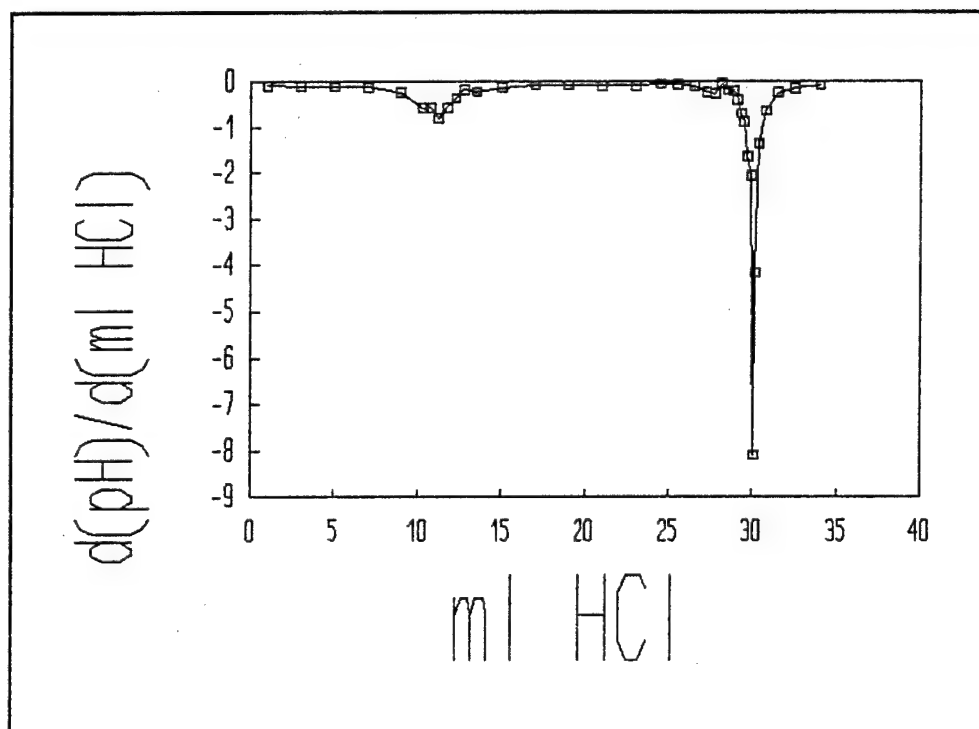


Figure C-74. First Derivative Of The First Titration Curve For Titration Of Fresh 75 Micron Sodium Bicarbonate Media With 0.961 M HCl.

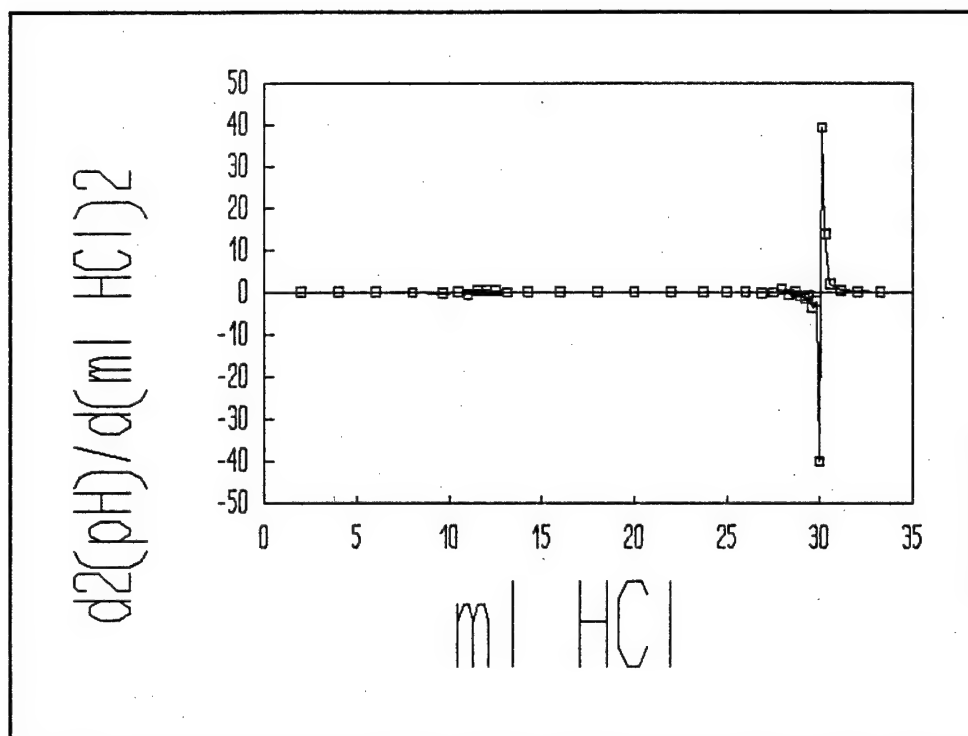


Figure C-75. Second Derivative Of The First Titration Curve For Titration Of Fresh 75 Micron Sodium Bicarbonate Media With 0.961 M HCl.

TABLE 26. FRESH 75 MICRON SODIUM BICARBONATE MEDIA - TITRATION 2.

<u>ml 0.961M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	10.337	1.00	-0.06	2.00	0.01
2.0	10.223	3.00	-0.04	4.00	-0.01
4.0	10.139	5.00	-0.06	6.00	0.01
6.0	10.023	7.00	-0.03	8.00	0.00
8.0	9.955	9.00	-0.03	9.75	-0.11
10.0	9.893	10.50	-0.19	11.00	0.15
11.0	9.701	11.50	-0.04	12.00	-0.03
12.0	9.657	12.50	-0.07	13.00	0.01
13.0	9.587	13.50	-0.06	14.25	-0.50
14.0	9.532	15.00	-0.81	15.63	0.19
16.0	7.917	16.25	-0.57	16.50	0.37
16.5	7.630	16.75	-0.39	17.00	0.22
17.0	7.435	17.25	-0.28	17.50	-0.14
17.5	7.295	17.75	-0.35	18.38	0.13
18.0	7.121	19.00	-0.19	20.00	0.03
20.0	6.745	21.00	-0.13	22.00	0.01
22.0	6.492	23.00	-0.11	24.00	0.00
24.0	6.269	25.00	-0.11	26.00	-0.01
26.0	6.051	27.00	-0.13	27.63	-0.05
28.0	5.782	28.25	-0.20	28.50	-0.18
28.5	5.684	28.75	-0.29	28.95	-0.16
29.0	5.541	29.15	-0.35	29.33	-0.39
29.3	5.436	29.50	-0.49	29.68	-1.28
29.7	5.241	29.85	-0.94	29.95	-2.27
30.0	4.960	30.05	-1.39	30.10	-6.60
30.1	4.821	30.15	-2.05	30.23	0.37
30.2	4.616	30.30	-2.00	30.40	-20.45
30.4	4.217	30.50	-6.08	30.60	21.57
30.6	3.000	30.70	-1.77	30.80	4.25
30.8	2.646	30.90	-0.92	31.08	1.07
31.0	2.462	31.25	-0.55	31.50	0.51
31.5	2.189	31.75	-0.29	32.13	0.15
32.0	2.044	32.50	-0.18	33.00	0.07
33.0	1.869	33.50	-0.11	34.00	0.03
34.0	1.763	34.50	-0.08	26.00	-0.01
35.0	1.686	17.50	0.05	8.75	0.00

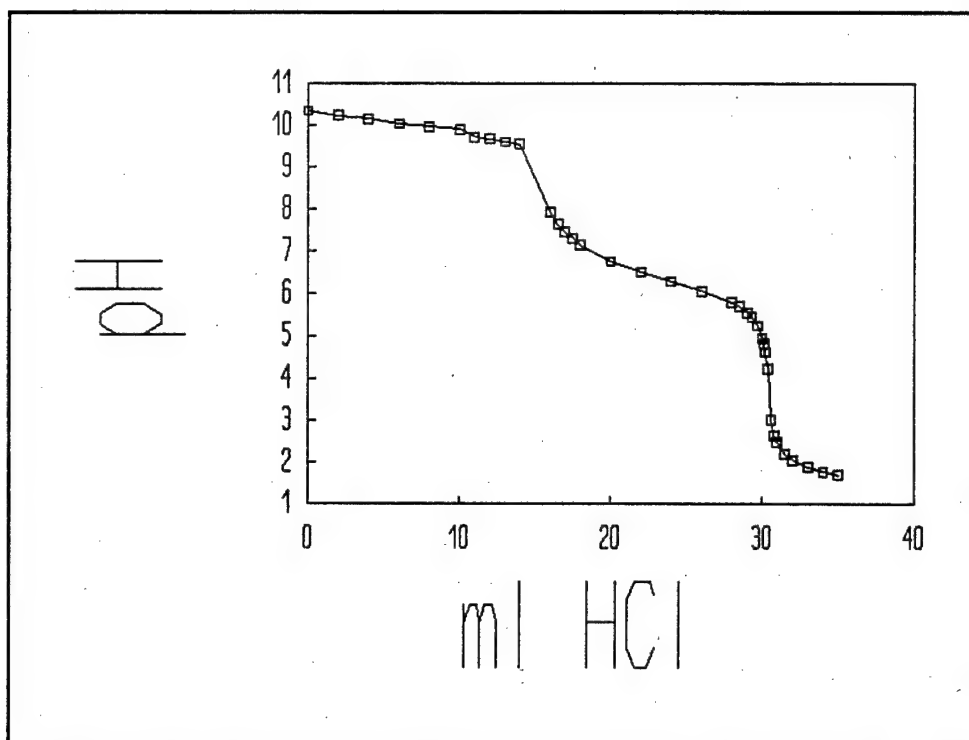


Figure C-76. Curve For The Second Titration Of Fresh 75 Micron Sodium Bicarbonate Media With 0.961 M HCl.

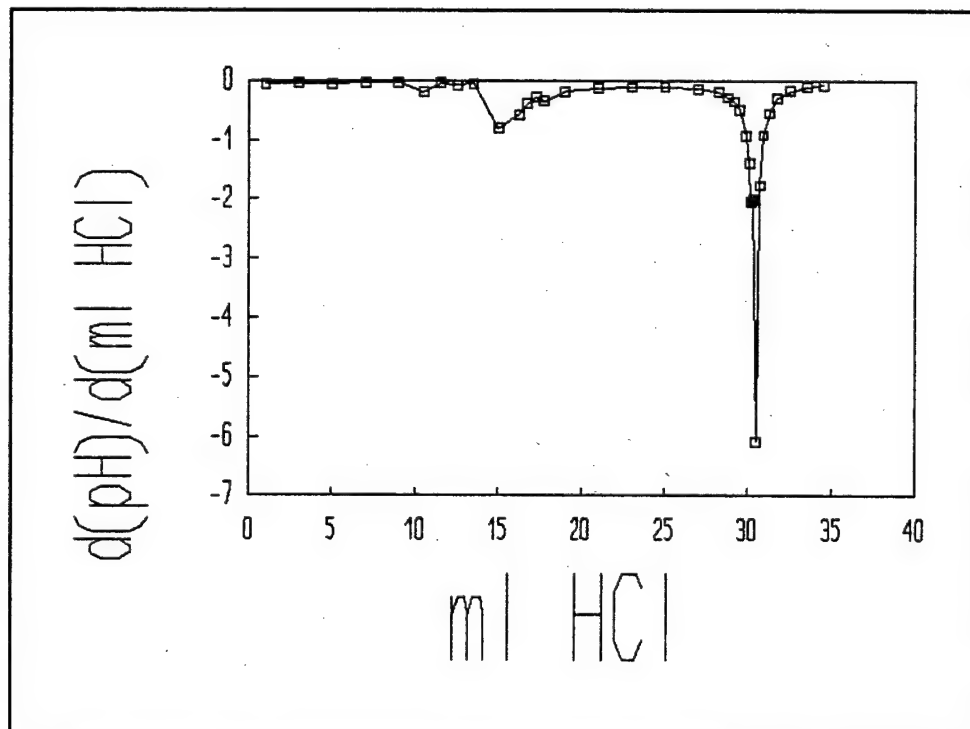


Figure C-77. First Derivative Of The Second Titration Curve For Titration Of Fresh 75 Micron Sodium Bicarbonate Media With 0.961 M HCl.

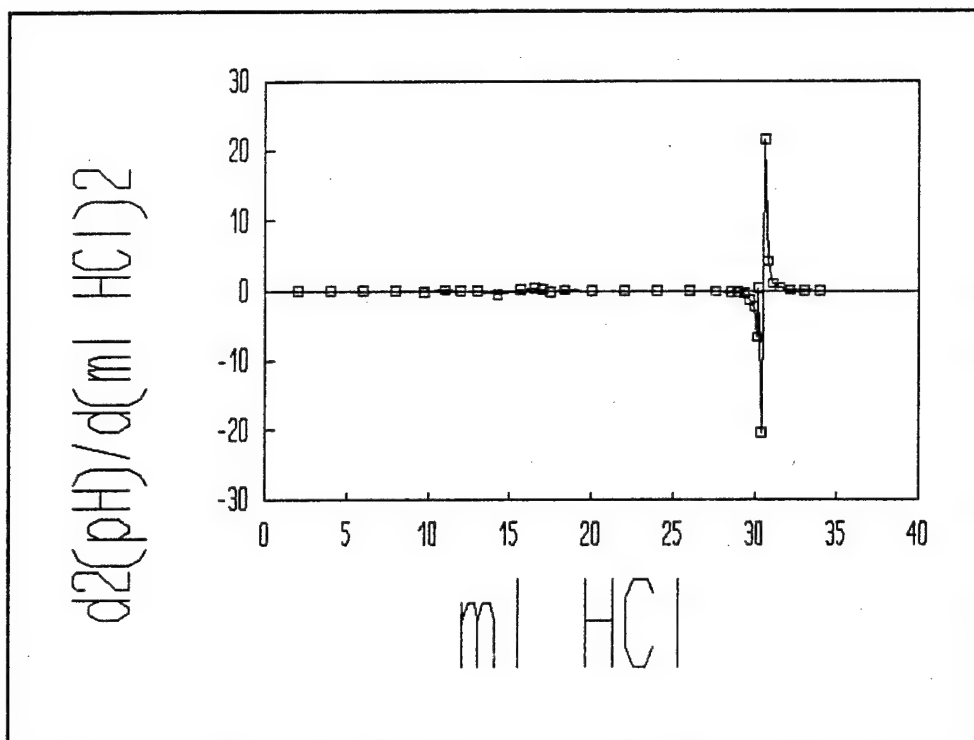


Figure C-78. Second Derivative Of The Second Titration Curve For Titration Of Fresh 75 Micron Sodium Bicarbonate Media With 0.961 M HCl.

TABLE 27. FRESH 75 MICRON SODIUM BICARBONATE MEDIA - TITRATION 3.

<u>ml 0.961M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	10.195	1.00	-0.08	2.00	-0.01
2.0	10.035	3.00	-0.11	4.00	-0.01
4.0	9.819	5.00	-0.12	6.00	0.00
6.0	9.572	7.00	-0.12	8.00	-0.05
8.0	9.337	9.00	-0.23	9.75	-0.11
10.0	8.883	10.50	-0.40	10.88	-0.63
11.0	8.486	11.25	-0.87	11.50	0.33
11.5	8.051	11.75	-0.70	12.00	0.50
12.0	7.699	12.25	-0.46	12.50	0.18
12.5	7.471	12.75	-0.37	13.13	0.16
13.0	7.288	13.50	-0.24	14.25	0.07
14.0	7.044	15.00	-0.15	16.00	0.02
16.0	6.753	17.00	-0.10	18.00	0.01
18.0	6.555	19.00	-0.07	20.00	0.00
20.0	6.416	21.00	-0.07	22.00	-0.01
22.0	6.278	23.00	-0.08	24.00	-0.01
24.0	6.117	25.00	-0.11	25.75	-0.00
26.0	5.897	26.50	-0.11	27.00	-0.08
27.0	5.787	27.50	-0.19	27.88	0.05
28.0	5.601	28.25	-0.15	28.50	-0.12
28.5	5.528	28.75	-0.21	29.00	-0.58
29.0	5.425	29.25	-0.50	29.43	-1.13
29.5	5.176	29.60	-0.89	29.73	-4.98
29.7	4.997	29.85	-2.14	29.95	-25.30
30.0	4.355	30.05	-7.20	30.10	20.70
30.1	3.635	30.15	-5.13	30.20	27.60
30.2	3.122	30.25	-2.37	30.30	7.20
30.3	2.885	30.35	-1.65	30.45	3.43
30.4	2.720	30.55	-0.96	30.70	1.59
30.7	2.431	30.85	-0.49	31.05	0.32
31.0	2.285	31.25	-0.36	31.50	0.28
31.5	2.105	31.75	-0.22	32.13	0.09
32.0	1.996	32.50	-0.15	33.00	0.05
33.0	1.846	33.50	-0.10	34.00	0.02
34.0	1.751	34.50	-0.07	26.00	-0.01
35.0	1.679	17.50	0.05	8.75	0.00

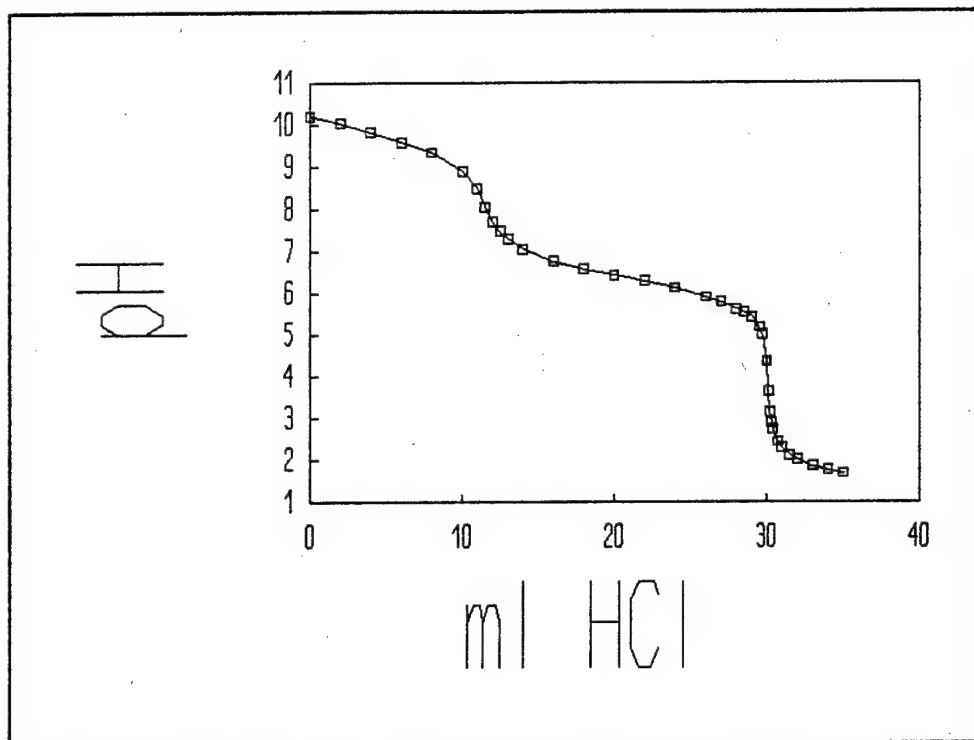


Figure C-79. Curve For The Third Titration Of Fresh 75 Micron Sodium Bicarbonate Media With 0.961 M HCl.

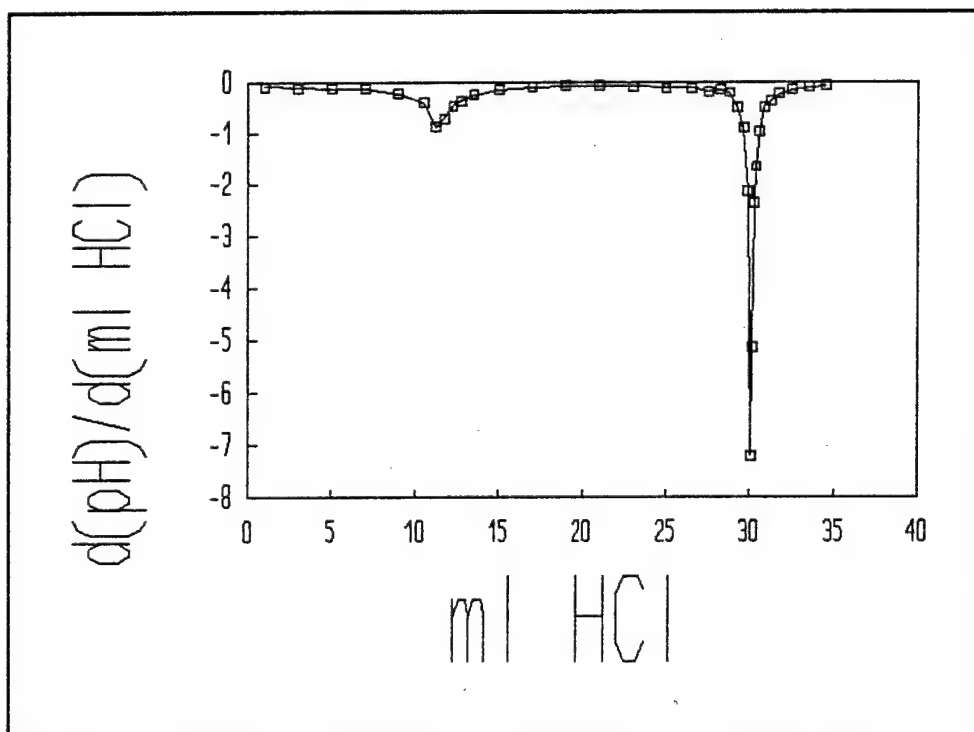


Figure C-80. First Derivative Of The Third Titration Curve For Titration Of Fresh 75 Micron Sodium Bicarbonate Media With 0.961 M HCl.

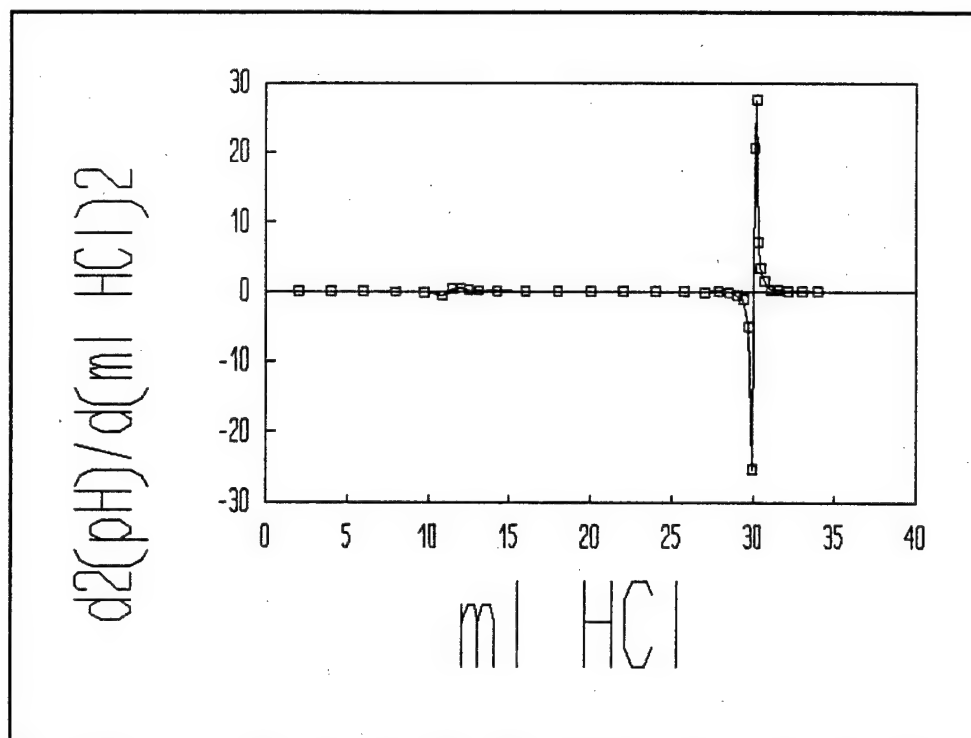


Figure C-81. Second Derivative Of The Third Titration Curve For Titration Of Fresh 75 Micron Sodium Bicarbonate Media With 0.961 M HCl.

TABLE 28. FRESH 75 MICRON SODIUM BICARBONATE MEDIA - TITRATION 4.

<u>ml 0.961M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d²(pH)/d(ml)²</u>
0.0	10.345	1.00	-0.12	2.00	-0.00
2.0	10.097	3.00	-0.13	4.00	0.02
4.0	9.845	5.00	-0.08	6.00	-0.03
6.0	9.686	7.00	-0.14	8.00	-0.06
8.0	9.416	9.00	-0.26	9.75	0.17
10.0	8.889	10.50	-0.01	10.88	-2.18
11.0	8.882	11.25	-1.64	11.50	2.01
11.5	8.060	11.75	-0.64	12.00	0.32
12.0	7.741	12.25	-0.48	12.50	0.25
12.5	7.503	12.75	-0.35	13.13	0.12
13.0	7.327	13.50	-0.26	14.25	0.08
14.0	7.066	15.00	-0.14	16.00	0.02
16.0	6.794	17.00	-0.10	18.00	0.01
18.0	6.599	19.00	-0.08	20.00	0.01
20.0	6.441	21.00	-0.06	22.00	-0.01
22.0	6.328	23.00	-0.07	24.00	0.01
24.0	6.185	25.00	-0.06	25.75	-0.04
26.0	6.065	26.50	-0.12	27.00	-0.03
27.0	5.945	27.50	-0.15	28.00	-0.09
28.0	5.799	28.50	-0.23	28.88	0.06
29.0	5.568	29.25	-0.18	29.50	-0.61
29.5	5.476	29.75	-0.49	29.95	-0.91
30.0	5.232	30.15	-0.85	30.30	-4.69
30.3	4.976	30.45	-2.26	30.58	-11.80
30.6	4.298	30.70	-5.21	30.80	11.33
30.8	3.256	30.90	-2.94	31.08	6.51
31.0	2.667	31.25	-0.67	31.50	0.79
31.5	2.333	31.75	-0.27	32.13	0.02
32.0	2.196	32.50	-0.26	33.00	0.14
33.0	1.940	33.50	-0.11	34.00	0.03
34.0	1.828	34.50	-0.09	26.00	-0.01
35.0	1.741	17.50	0.05	8.75	0.00

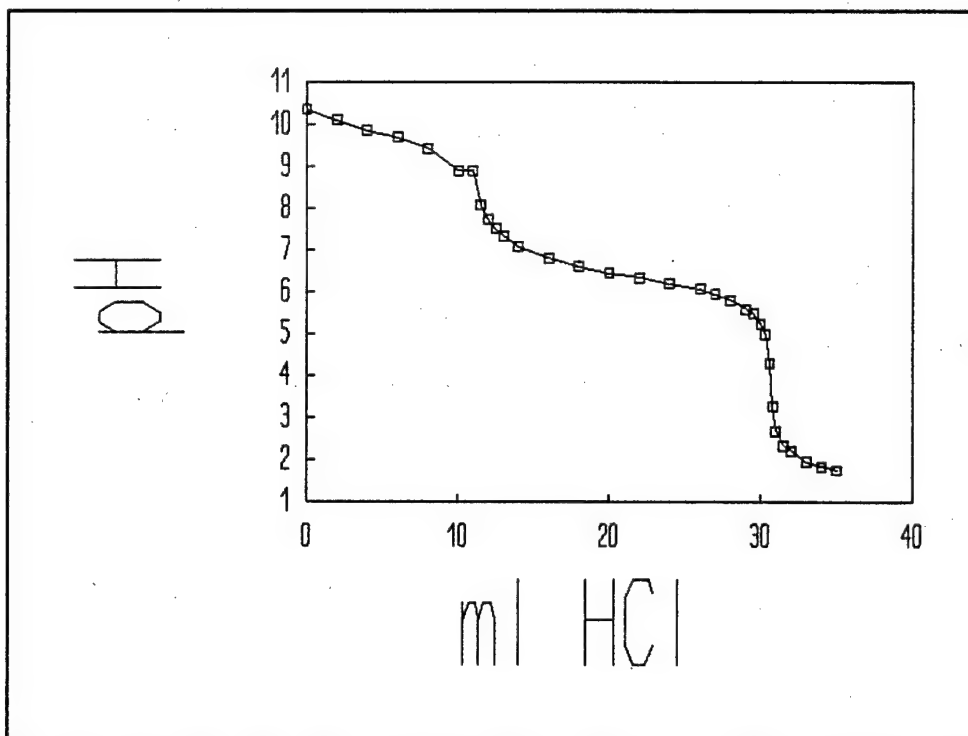


Figure C-82. Curve For The Fourth Titration Of Fresh 75 Micron Sodium Bicarbonate Media With 0.961 M HCl.

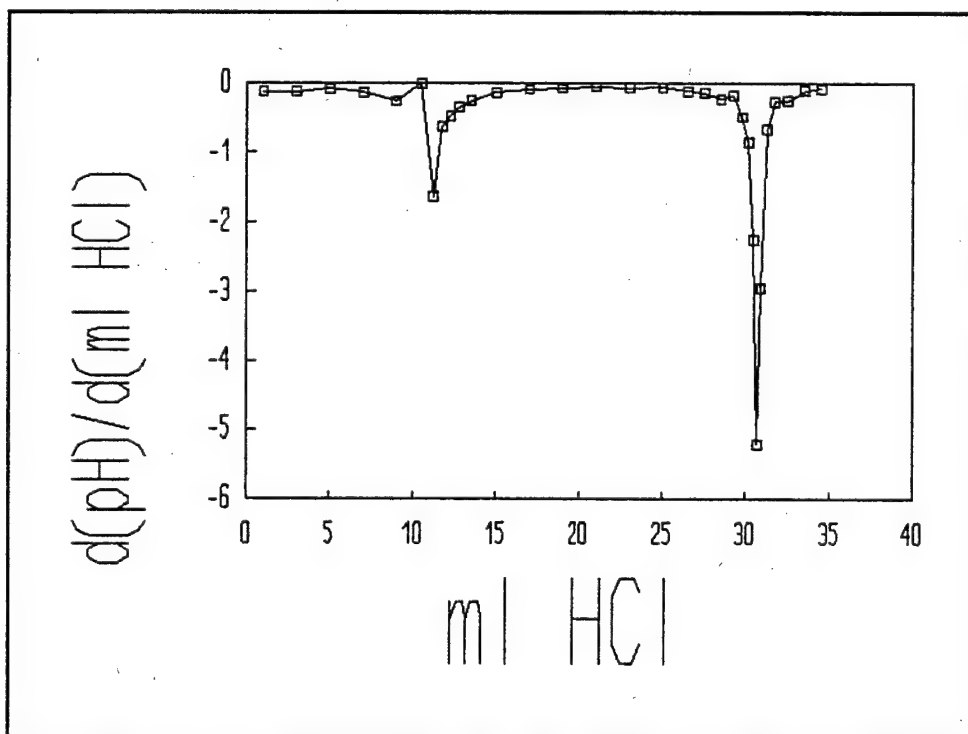


Figure C-83. First Derivative Of The Fourth Titration Curve For Titration Of Fresh 75 Micron Sodium Bicarbonate Media With 0.961 M HCl.

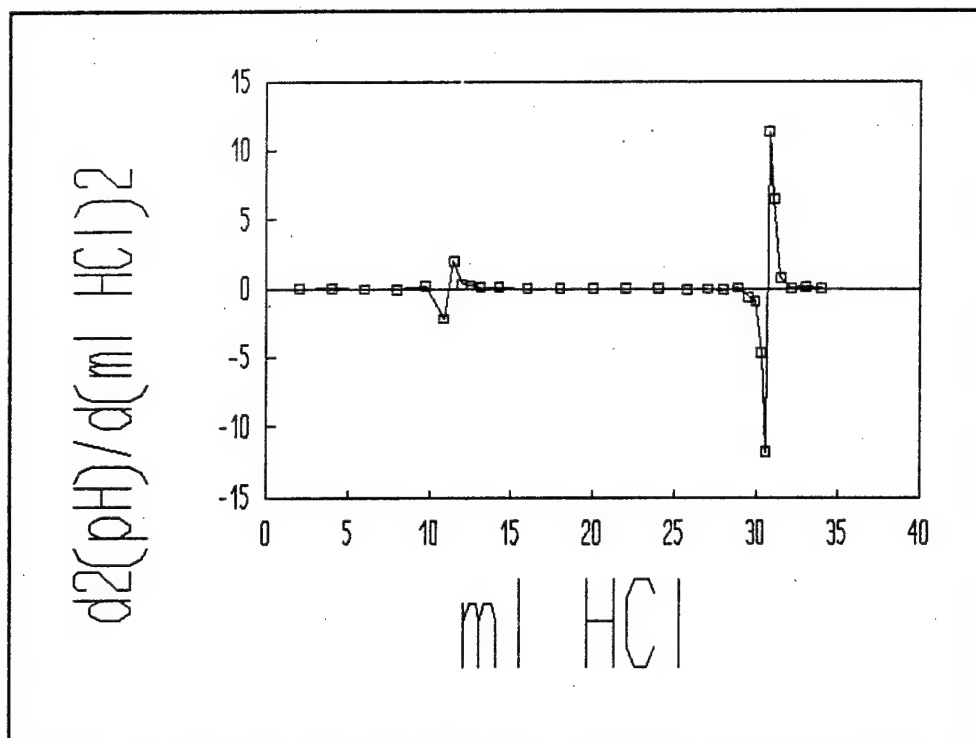


Figure C-84. Second Derivative Of The Fourth Titration Curve For Titration Of Fresh 75 Micron Sodium Bicarbonate Media With 0.961 M HCl.

TABLE 29. FRESH 45 MICRON SODIUM BICARBONATE MEDIA - TITRATION 1.

<u>ml 0.961M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	10.870	1.00	-0.15	2.00	0.02
2.0	10.578	3.00	-0.11	4.00	0.02
4.0	10.361	5.00	-0.07	6.00	0.01
6.0	10.217	7.00	-0.05	8.00	-0.07
8.0	10.111	9.00	-0.20	10.00	0.04
10.0	9.708	11.00	-0.11	12.00	-0.02
12.0	9.483	13.00	-0.15	13.75	-0.02
14.0	9.188	14.50	-0.18	15.00	-0.10
15.0	9.007	15.50	-0.28	15.88	-0.39
16.0	8.727	16.25	-0.57	16.50	0.04
16.5	8.441	16.75	-0.55	17.00	-0.38
17.0	8.164	17.25	-0.74	17.50	0.50
17.5	7.792	17.75	-0.50	18.00	0.47
18.0	7.544	18.25	-0.26	18.50	-0.04
18.5	7.413	18.75	-0.28	19.13	0.17
19.0	7.272	19.50	-0.15	20.25	-0.03
20.0	7.121	21.00	-0.20	22.00	0.04
22.0	6.726	23.00	-0.12	24.00	0.01
24.0	6.489	25.00	-0.11	26.00	0.00
26.0	6.274	27.00	-0.10	28.00	-0.01
28.0	6.071	29.00	-0.12	29.75	-0.03
30.0	5.831	30.50	-0.16	31.00	-0.04
31.0	5.672	31.50	-0.20	31.88	-0.11
32.0	5.469	32.25	-0.28	32.50	-0.64
32.5	5.327	32.75	-0.61	32.93	-1.14
33.0	5.024	33.10	-1.00	33.20	-6.67
33.2	4.823	33.30	-2.34	33.40	-15.65
33.4	4.355	33.50	-5.47	33.60	19.73
33.6	3.261	33.70	-1.52	33.80	-0.75
33.8	2.956	33.90	-1.67	34.08	2.84
34.0	2.621	34.25	-0.68	34.50	0.74
34.5	2.281	34.75	-0.31	35.13	0.14
35.0	2.127	35.50	-0.20	36.25	0.07
36.0	1.926	37.00	-0.10	38.00	0.02
38.0	1.722	39.00	-0.06	29.50	-0.01
40.0	1.604	20.00	0.04	10.00	0.00

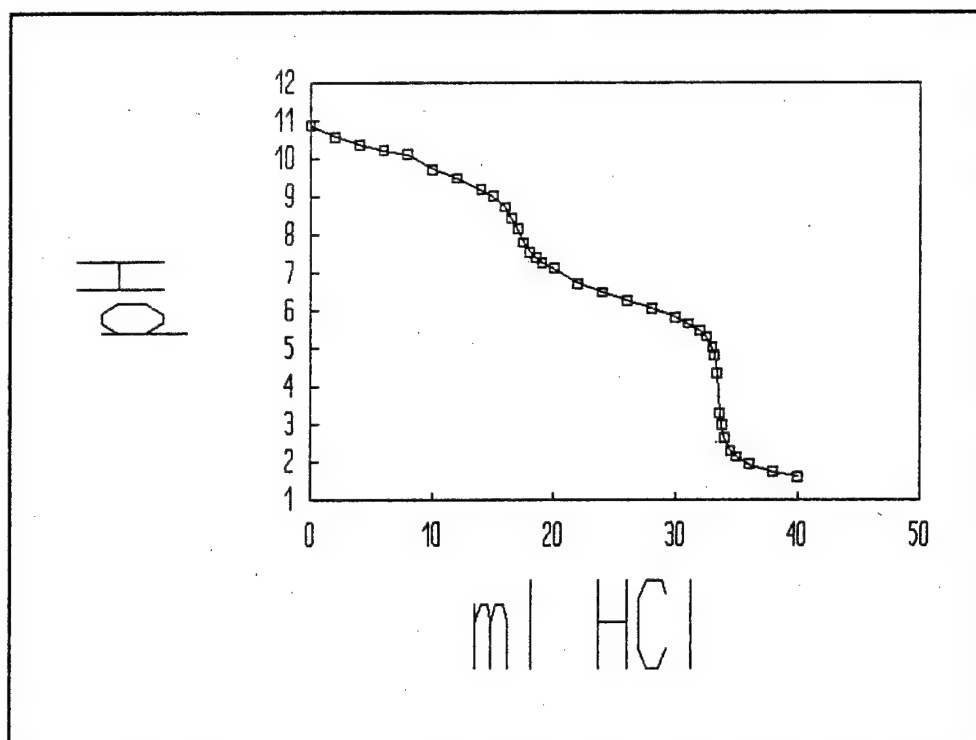


Figure C-85. Curve For The First Titration Of Fresh 45 Micron Sodium Bicarbonate Media With 0.961 M HCl.

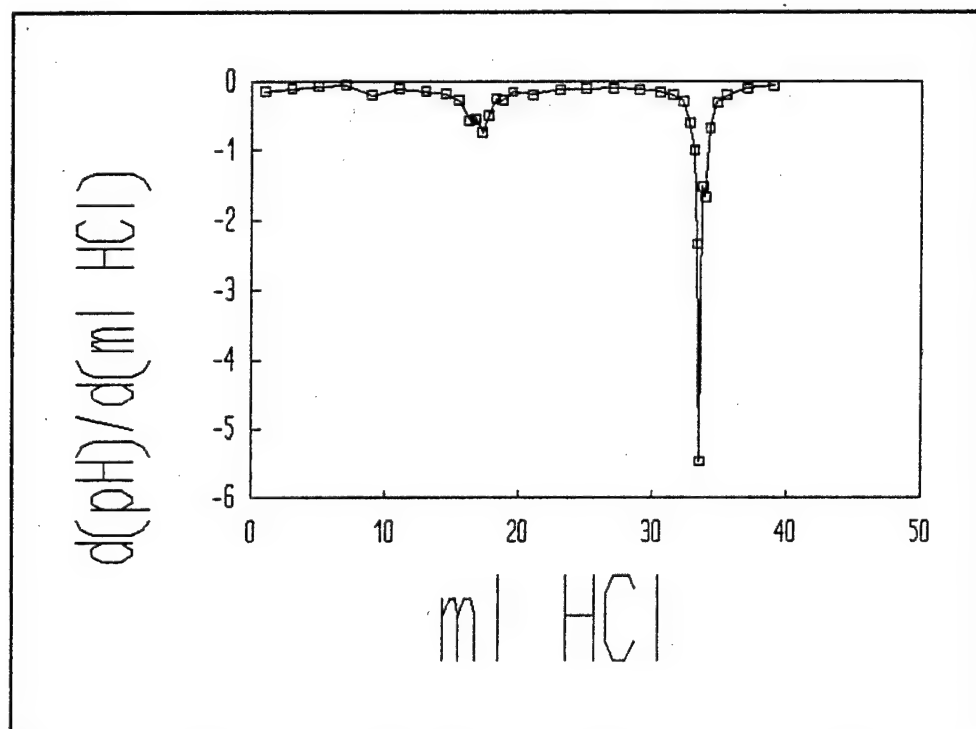


Figure C-86. First Derivative Of The First Titration Curve For Titration Of Fresh 45 Micron Sodium Bicarbonate Media With 0.961 M HCl.

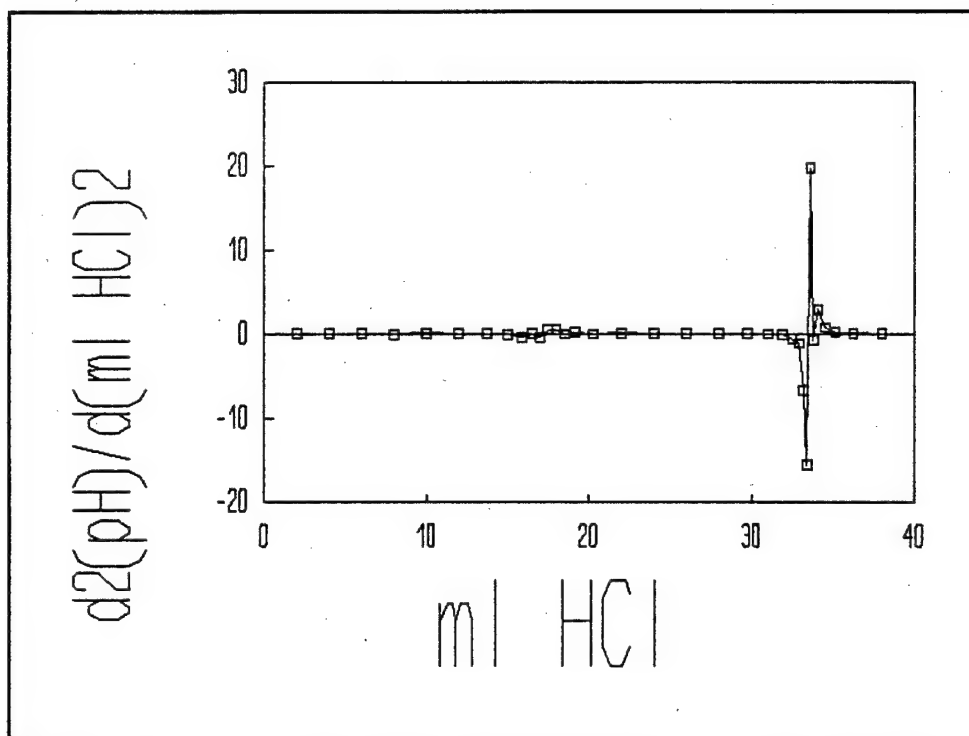


Figure C-87. Second Derivative Of The First Titration Curve For Titration Of Fresh 45 Micron Sodium Bicarbonate Media With 0.961 M HCl.

TABLE 30. FRESH 45 MICRON SODIUM BICARBONATE MEDIA - TITRATION 2.

<u>ml 0.961M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	10.893	1.00	-0.19	2.00	0.05
2.0	10.512	3.00	-0.08	4.00	-0.00
4.0	10.351	5.00	-0.09	6.00	0.01
6.0	10.177	7.00	-0.08	8.00	-0.04
8.0	10.027	9.00	-0.16	10.00	0.02
10.0	9.715	11.00	-0.12	12.00	0.01
12.0	9.474	13.00	-0.10	13.75	-0.04
14.0	9.271	14.50	-0.17	15.00	-0.08
15.0	9.105	15.50	-0.24	16.00	-0.49
16.0	8.862	16.50	-0.73	16.88	-0.12
17.0	8.132	17.25	-0.82	17.50	0.67
17.5	7.723	17.75	-0.48	18.00	0.22
18.0	7.481	18.25	-0.38	18.50	0.20
18.5	7.293	18.75	-0.28	19.13	0.12
19.0	7.155	19.50	-0.19	20.25	0.02
20.0	6.969	21.00	-0.15	22.00	0.02
22.0	6.664	23.00	-0.11	24.00	0.01
24.0	6.437	25.00	-0.10	26.00	-0.01
26.0	6.241	27.00	-0.11	28.00	0.00
28.0	6.024	29.00	-0.10	29.75	-0.09
30.0	5.822	30.50	-0.23	31.00	-0.16
31.0	5.593	31.50	-0.39	31.88	-0.70
32.0	5.205	32.25	-0.91	32.43	-5.04
32.5	4.750	32.60	-2.67	32.70	-13.57
32.7	4.215	32.80	-5.39	32.88	25.47
32.9	3.137	32.95	-1.57	33.05	0.83
33.0	2.980	33.15	-1.40	33.30	2.22
33.3	2.559	33.45	-0.74	33.63	1.16
33.6	2.338	33.80	-0.33	34.03	0.08
34.0	2.206	34.25	-0.29	34.50	0.25
34.5	2.060	34.75	-0.17	35.13	0.05
35.0	1.976	35.50	-0.13	36.25	0.03
36.0	1.845	37.00	-0.08	38.00	0.02
38.0	1.680	39.00	-0.05	29.50	-0.00
40.0	1.576	20.00	0.04	10.00	0.00

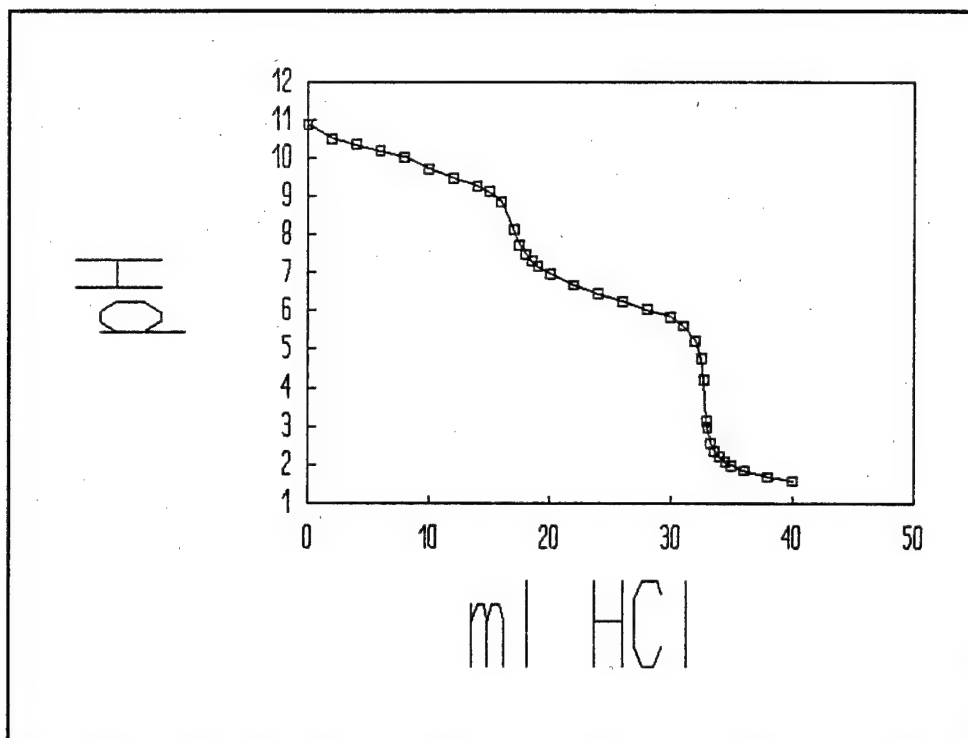


Figure C-88. Curve For The Second Titration Of Fresh 45 Micron Sodium Bicarbonate Media With 0.961 M HCl.

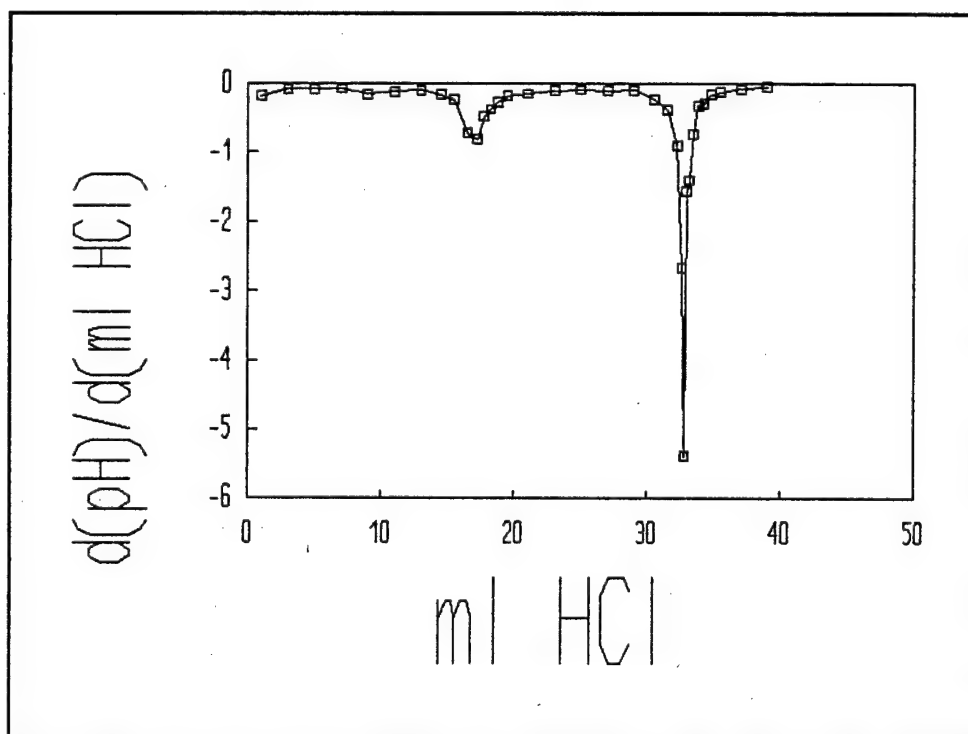


Figure C-89. First Derivative Of The Second Titration Curve For Titration Of Fresh 45 Micron Sodium Bicarbonate Media With 0.961 M HCl.

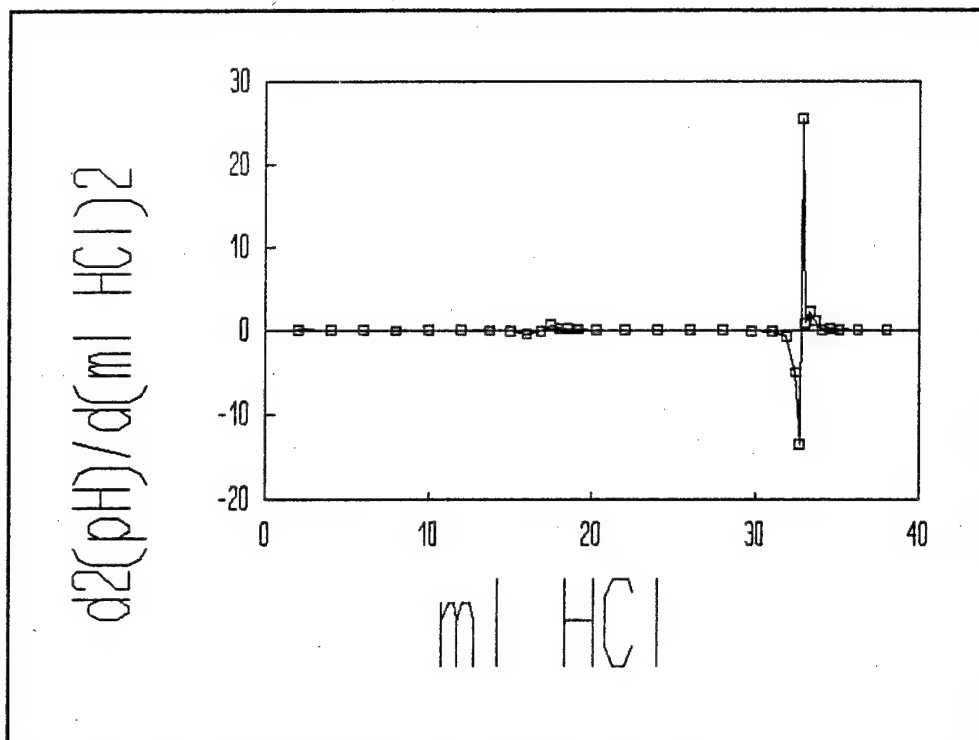


Figure C-90. Second Derivative Of The Second Titration Curve For Titration Of Fresh 45 Micron Sodium Bicarbonate Media With 0.961 M HCl.

TABLE 31. FRESH 45 MICRON SODIUM BICARBONATE MEDIA - TITRATION 3.

<u>ml 0.961M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	10.711	1.00	-0.17	2.00	0.03
2.0	10.428	3.00	-0.12	4.00	0.01
4.0	10.188	5.00	-0.11	6.00	0.00
6.0	9.971	7.00	-0.10	8.00	-0.00
8.0	9.774	9.00	-0.11	10.00	-0.01
10.0	9.564	11.00	-0.13	12.00	-0.03
12.0	9.298	13.00	-0.19	13.75	-0.09
14.0	8.911	14.50	-0.33	14.88	-0.29
15.0	8.583	15.25	-0.54	15.50	-0.70
15.5	8.312	15.75	-0.89	16.00	0.40
16.0	7.865	16.25	-0.70	16.50	0.63
16.5	7.517	16.75	-0.38	17.00	0.08
17.0	7.326	17.25	-0.34	17.50	0.23
17.5	7.155	17.75	-0.23	18.38	0.05
18.0	7.041	19.00	-0.16	20.00	0.03
20.0	6.715	21.00	-0.11	22.00	0.02
22.0	6.490	23.00	-0.08	24.00	0.01
24.0	6.326	25.00	-0.06	26.00	-0.00
26.0	6.199	27.00	-0.06	28.00	-0.02
28.0	6.071	29.00	-0.10	29.75	0.02
30.0	5.871	30.50	-0.07	30.88	-0.10
31.0	5.798	31.25	-0.15	31.50	0.09
31.5	5.724	31.75	-0.10	32.00	-0.10
32.0	5.672	32.25	-0.15	32.50	-0.36
32.5	5.596	32.75	-0.33	33.00	-0.10
33.0	5.429	33.25	-0.38	33.43	0.02
33.5	5.238	33.60	-0.38	33.72	-2.77
33.7	5.163	33.85	-1.07	33.97	0.53
34.0	4.843	34.10	-0.93	34.20	-19.07
34.2	4.656	34.30	-4.75	34.38	-6.53
34.4	3.706	34.45	-5.73	34.53	24.03
34.5	3.133	34.60	-2.12	34.72	4.49
34.7	2.708	34.85	-1.00	35.05	1.29
35.0	2.407	35.25	-0.49	35.50	0.38
35.5	2.163	35.75	-0.30	36.13	0.16
36.0	2.014	36.50	-0.18	37.00	0.04
37.0	1.838	37.50	-0.14	38.25	0.05
38.0	1.701	39.00	-0.06	29.50	-0.01
40.0	1.572	20.00	0.04	10.00	0.00

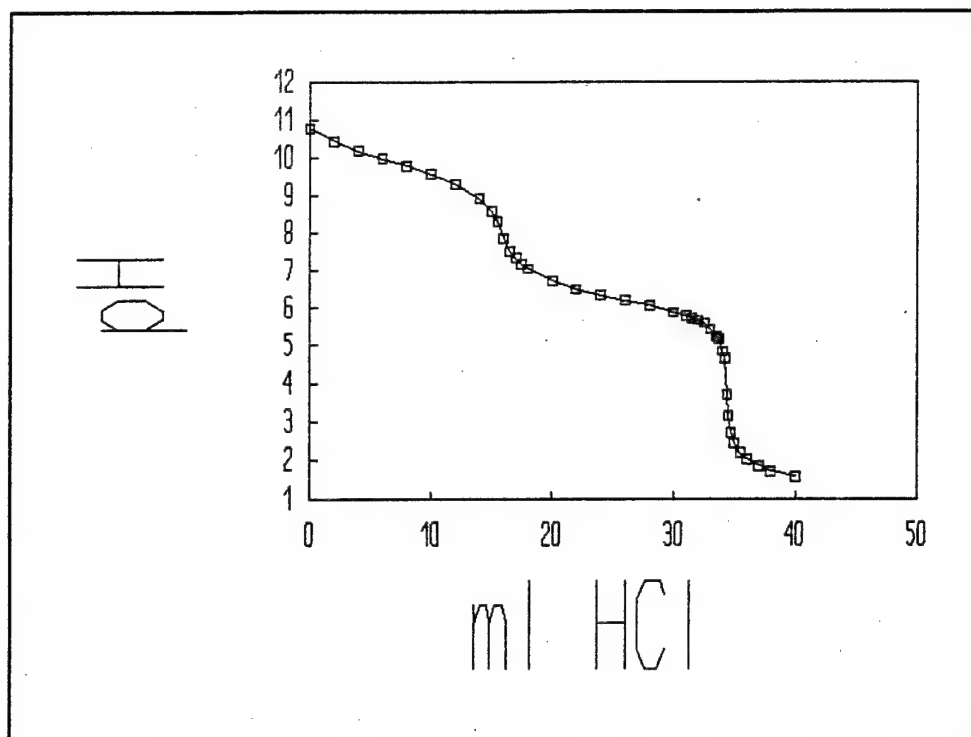


Figure C-91. Curve For The Third Titration Of Fresh 45 Micron Sodium Bicarbonate Media With 0.961 M HCl.

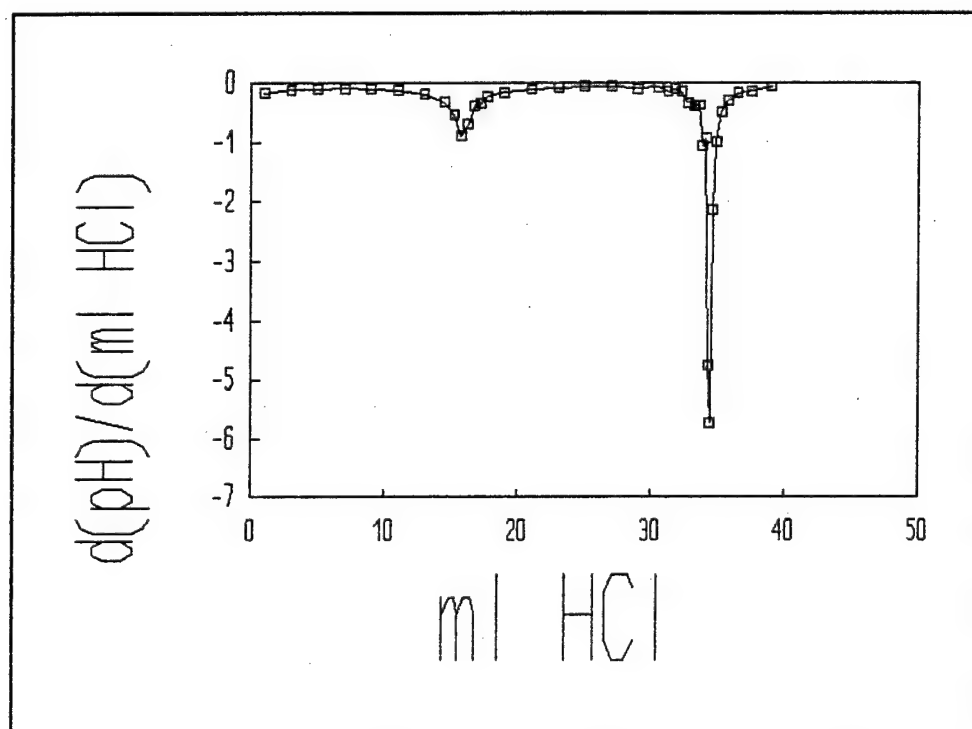


Figure C-92. First Derivative Of The Third Titration Curve For Titration Of Fresh 45 Micron Sodium Bicarbonate Media With 0.961 M HCl.

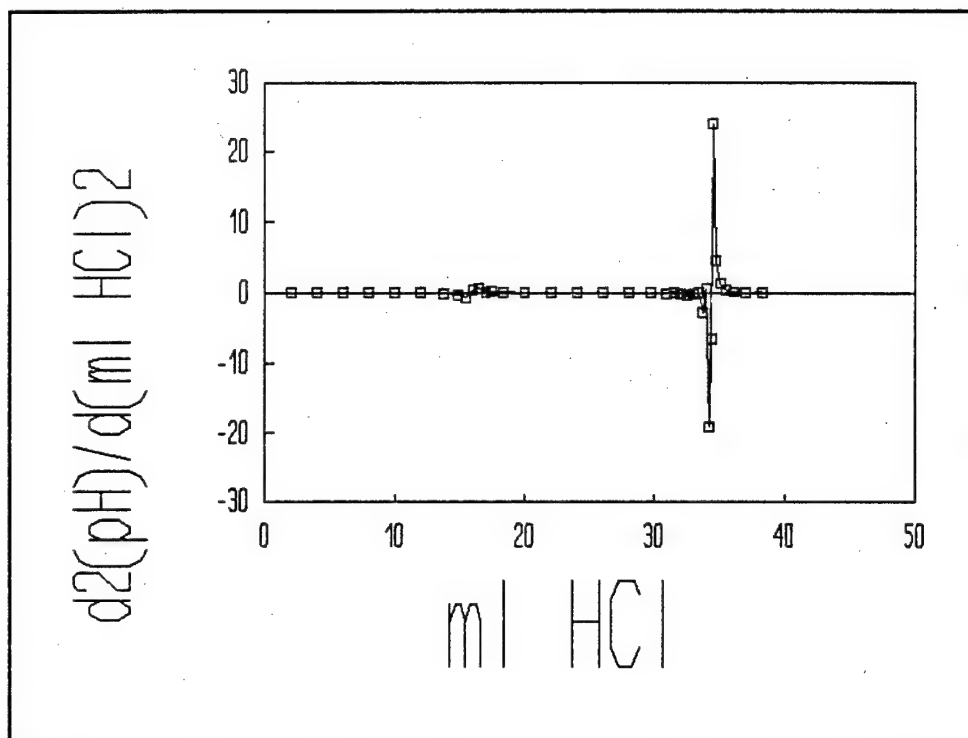


Figure C-93. Second Derivative Of The Third Titration Curve For Titration Of Fresh 45 Micron Sodium Bicarbonate Media With 0.961 M HCl.

TABLE 32. FRESH 45 MICRON SODIUM BICARBONATE MEDIA - TITRATION 4.

ml 0.961M HCl	pH	Vol (ml)	d(pH)/d(ml)	Vol (ml)	d2(pH)/d(ml) ²
0.0	11.044	1.00	-0.20	2.00	0.03
2.0	10.640	3.00	-0.13	4.00	0.00
4.0	10.371	5.00	-0.13	6.00	0.01
6.0	10.113	7.00	-0.11	8.00	-0.01
8.0	9.888	9.00	-0.12	10.00	-0.01
10.0	9.641	11.00	-0.14	12.00	-0.03
12.0	9.357	13.00	-0.21	13.75	-0.11
14.0	8.940	14.50	-0.38	14.88	-0.24
15.0	8.559	15.25	-0.56	15.50	-0.79
15.5	8.280	15.75	-0.95	16.00	0.74
16.0	7.803	16.25	-0.58	16.50	0.26
16.5	7.511	16.75	-0.45	17.13	0.25
17.0	7.284	17.50	-0.26	18.25	0.07
18.0	7.021	19.00	-0.16	20.00	0.03
20.0	6.694	21.00	-0.10	22.00	0.01
22.0	6.487	23.00	-0.09	24.13	0.01
24.0	6.302	25.25	-0.07	26.25	-0.00
26.5	6.122	27.25	-0.08	28.13	-0.04
28.0	6.008	29.00	-0.14	29.75	0.03
30.0	5.720	30.50	-0.10	30.88	-0.05
31.0	5.618	31.25	-0.14	31.50	-0.14
31.5	5.547	31.75	-0.21	32.00	-0.29
32.0	5.442	32.25	-0.35	32.50	-0.63
32.5	5.265	32.75	-0.67	32.93	-3.25
33.0	4.931	33.10	-1.80	33.20	-18.72
33.2	4.570	33.30	-5.55	33.40	10.57
33.4	3.460	33.50	-3.44	33.60	10.95
33.6	2.773	33.70	-1.24	33.80	3.57
33.8	2.524	33.90	-0.53	34.08	0.18
34.0	2.418	34.25	-0.47	34.50	0.26
34.5	2.185	34.75	-0.34	35.13	0.21
35.0	2.016	35.50	-0.18	36.25	0.05
36.0	1.833	37.00	-0.10	38.00	0.02
38.0	1.627	39.00	-0.06	29.50	-0.01
40.0	1.509	20.00	0.04	10.00	0.00

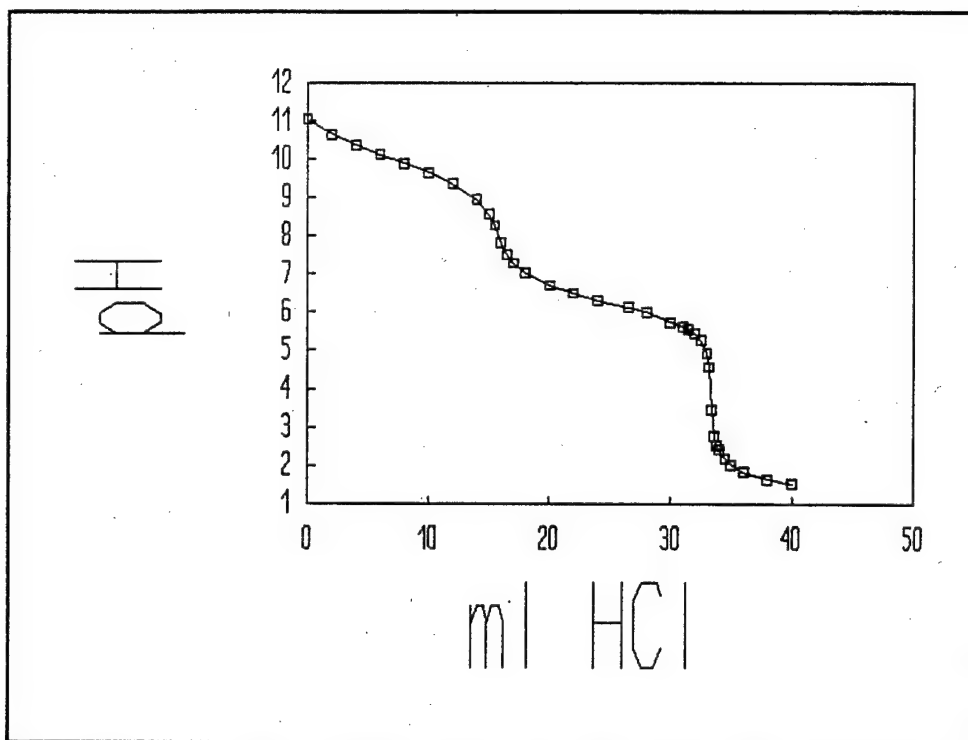


Figure C-94. Curve For The Fourth Titration Of Fresh 45 Micron Sodium Bicarbonate Media With 0.961 M HCl.

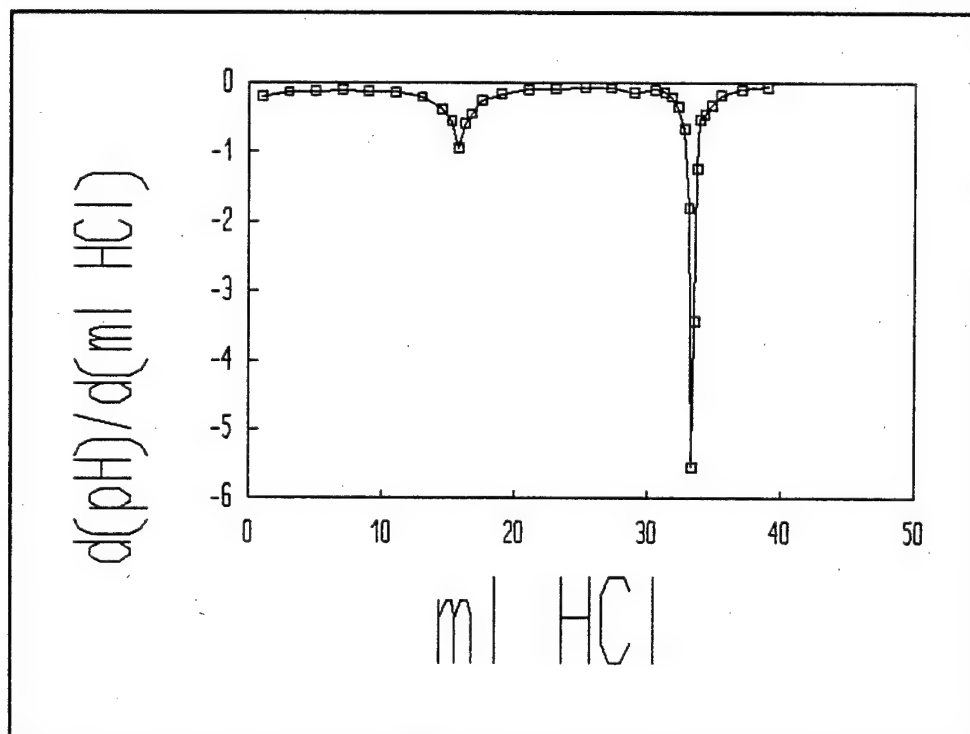


Figure C-95. First Derivative Of The Fourth Titration Curve For Titration Of Fresh 45 Micron Sodium Bicarbonate Media With 0.961 M HCl.

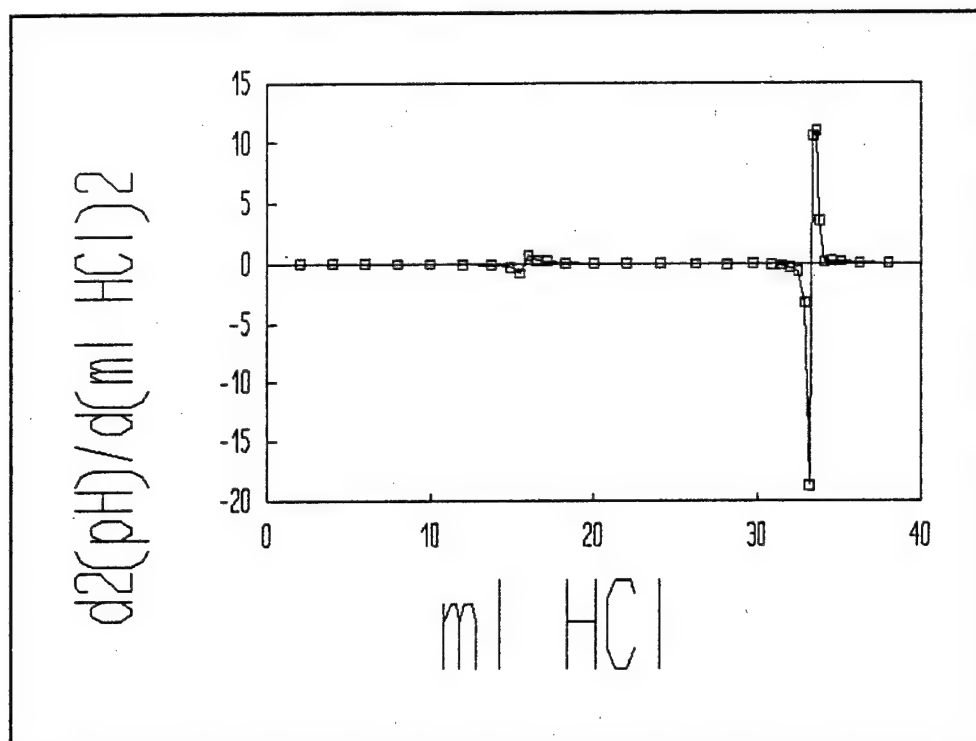


Figure C-96. Second Derivative Of The Fourth Titration Curve For Titration Of Fresh 45 Micron Sodium Bicarbonate Media With 0.961 M HCl.

TABLE 33. FRESH <45 MICRON SODIUM BICARBONATE MEDIA - TITRATION 1.

<u>ml 0.961M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d²(pH)/d(ml)²</u>
0.0	11.337	1.00	-0.30	2.00	0.06
2.0	10.736	3.00	-0.17	4.00	0.03
4.0	10.386	5.00	-0.12	6.00	0.01
6.0	10.139	7.00	-0.11	8.00	-0.00
8.0	9.914	9.00	-0.12	10.00	-0.00
10.0	9.678	11.00	-0.12	11.75	-0.03
12.0	9.438	12.50	-0.17	13.00	-0.00
13.0	9.268	13.50	-0.17	14.00	-0.08
14.0	9.097	14.50	-0.25	15.00	-0.23
15.0	8.846	15.50	-0.48	15.88	-0.72
16.0	8.365	16.25	-1.02	16.50	0.61
16.5	7.854	16.75	-0.72	17.00	0.68
17.0	7.495	17.25	-0.38	17.50	0.10
17.5	7.305	17.75	-0.33	18.38	0.10
18.0	7.140	19.00	-0.20	20.00	0.03
20.0	6.738	21.00	-0.13	22.00	0.02
22.0	6.474	23.00	-0.09	24.00	0.01
24.0	6.295	25.00	-0.08	26.00	-0.01
26.0	6.142	27.00	-0.11	28.00	-0.01
28.0	5.931	29.00	-0.12	29.75	-0.03
30.0	5.691	30.50	-0.17	30.88	-0.12
31.0	5.525	31.25	-0.25	31.50	-0.16
31.5	5.398	31.75	-0.34	32.00	-0.25
32.0	5.230	32.25	-0.46	32.45	-1.75
32.5	5.000	32.65	-1.16	32.78	-3.16
32.8	4.652	32.90	-1.95	33.00	-19.43
33.0	4.262	33.10	-5.83	33.20	18.77
33.2	3.095	33.30	-2.08	33.40	5.50
33.4	2.679	33.50	-0.98	33.60	2.53
33.6	2.483	33.70	-0.47	33.80	-0.47
33.8	2.388	33.90	-0.57	34.08	0.65
34.0	2.274	34.25	-0.34	34.50	0.16
34.5	2.103	34.75	-0.26	35.13	0.18
35.0	1.972	35.50	-0.13	36.25	0.03
36.0	1.842	37.00	-0.09	38.00	0.02
38.0	1.663	39.00	-0.06	29.50	-0.01
40.0	1.548	20.00	0.04	10.00	0.00

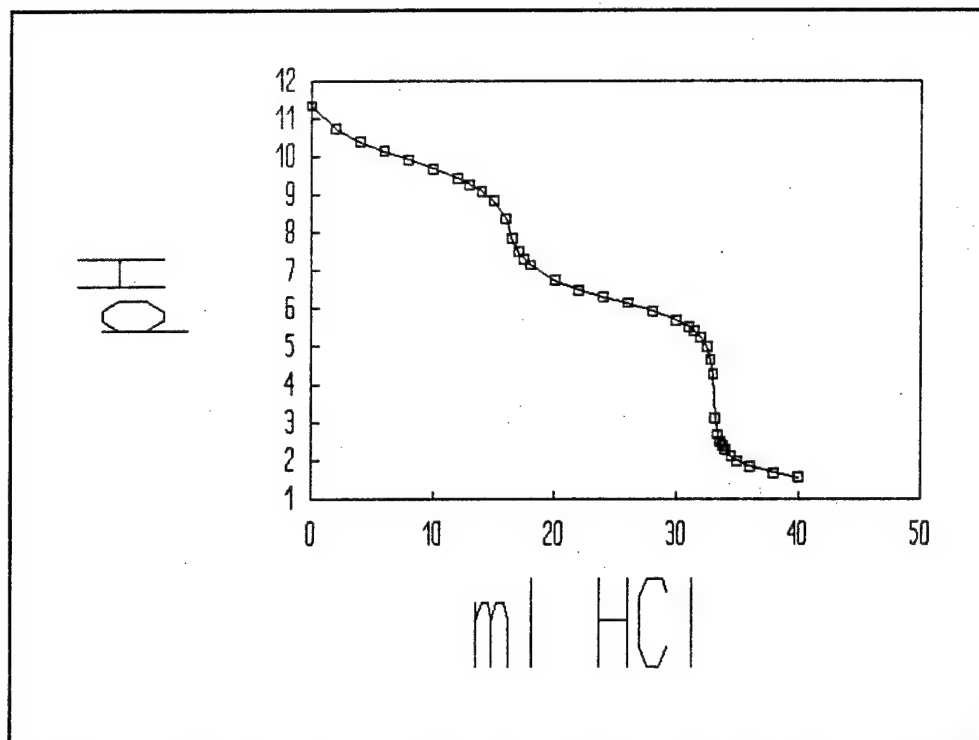


Figure C-97. Curve For The First Titration Of Fresh <45 Micron Sodium Bicarbonate Media With 0.961 M HCl.

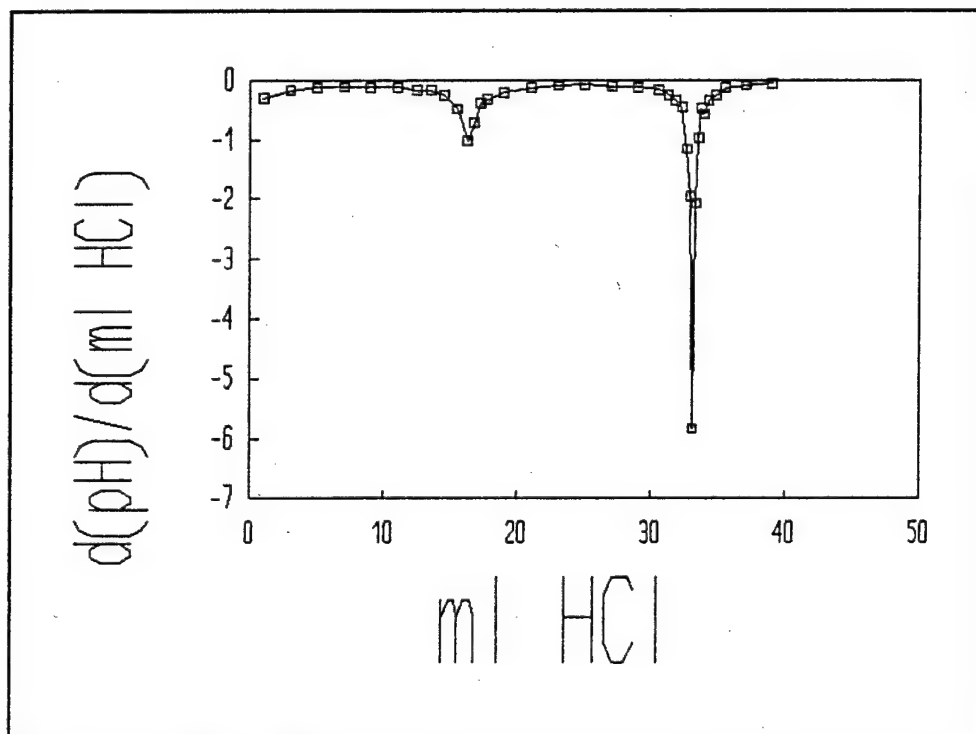


Figure C-98. First Derivative Of The First Titration Curve For Titration Of Fresh <45 Micron Sodium Bicarbonate Media With 0.961 M HCl.

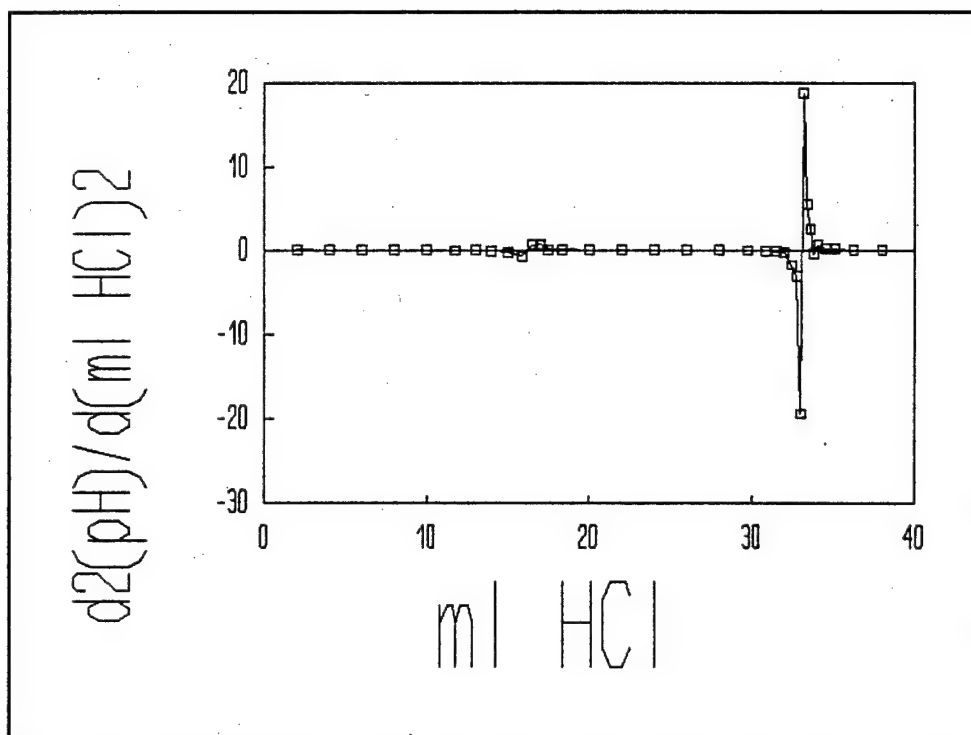


Figure C-99. Second Derivative Of The First Titration Curve For Titration Of Fresh <45 Micron Sodium Bicarbonate Media With 0.961 M HCl.

TABLE 34. FRESH <45 MICRON SODIUM BICARBONATE MEDIA - TITRATION 2.

<u>ml 0.961M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	11.623	1.00	-0.36	2.00	0.07
2.0	10.909	3.00	-0.23	4.00	0.05
4.0	10.455	5.00	-0.13	6.00	0.01
6.0	10.205	7.00	-0.11	8.00	0.00
8.0	9.977	9.00	-0.11	10.00	-0.01
10.0	9.757	11.00	-0.13	12.00	-0.01
12.0	9.503	13.00	-0.15	13.75	-0.07
14.0	9.206	14.50	-0.25	15.00	-0.15
15.0	8.956	15.50	-0.40	15.88	-0.34
16.0	8.555	16.25	-0.66	16.50	-0.53
16.5	8.227	16.75	-0.92	17.00	0.63
17.0	7.767	17.25	-0.60	17.50	0.47
17.5	7.465	17.75	-0.37	18.13	0.12
18.0	7.281	18.50	-0.28	19.00	0.12
19.0	7.006	19.50	-0.16	20.25	0.02
20.0	6.847	21.00	-0.14	22.00	0.02
22.0	6.575	23.00	-0.09	24.00	-0.00
24.0	6.400	25.00	-0.10	26.00	-0.00
26.0	6.209	27.00	-0.10	28.00	-0.00
28.0	6.006	29.00	-0.10	29.75	-0.03
30.0	5.802	30.50	-0.15	30.88	-0.01
31.0	5.654	31.25	-0.15	31.50	-0.04
31.5	5.578	31.75	-0.17	32.00	-0.28
32.0	5.493	32.25	-0.31	32.50	-0.40
32.5	5.339	32.75	-0.51	32.93	-1.18
33.0	5.085	33.10	-0.92	33.20	-5.57
33.2	4.901	33.30	-2.03	33.40	-18.45
33.4	4.494	33.50	-5.73	33.60	14.90
33.6	3.349	33.70	-2.74	33.80	7.12
33.8	2.800	33.90	-1.32	34.08	2.21
34.0	2.536	34.25	-0.55	34.50	0.47
34.5	2.262	34.75	-0.31	35.13	0.18
35.0	2.106	35.50	-0.18	36.25	0.05
36.0	1.926	37.00	-0.10	38.00	0.02
38.0	1.719	39.00	-0.06	29.50	-0.01
40.0	1.599	20.00	0.04	10.00	0.00

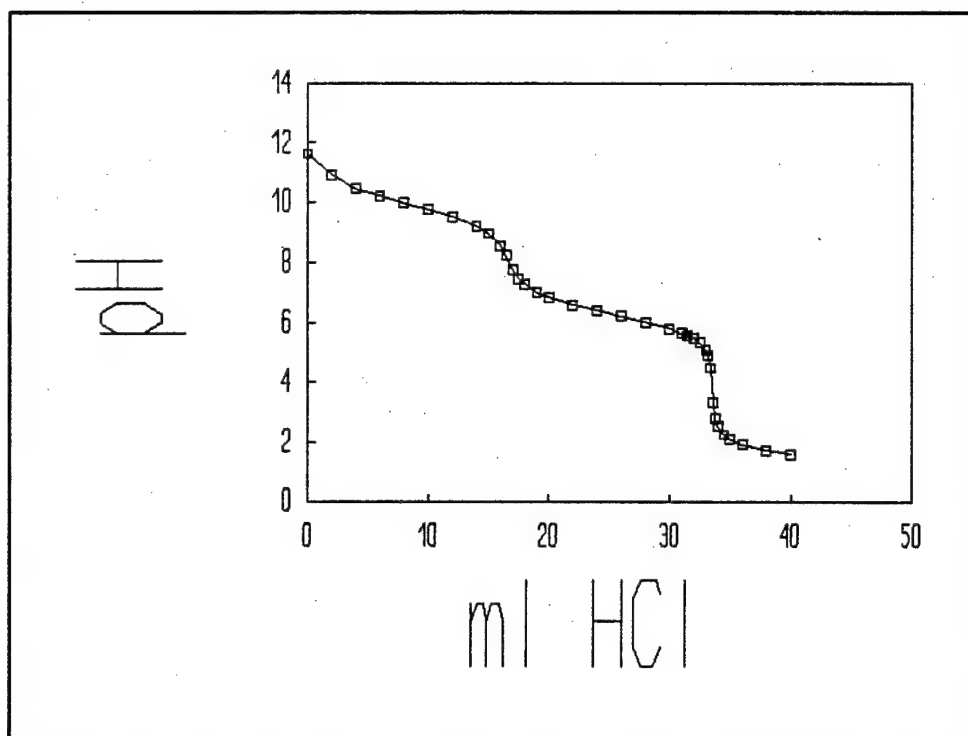


Figure C-100. Curve For The Second Titration Of Fresh <45 Micron Sodium Bicarbonate Media With 0.961 M HCl.

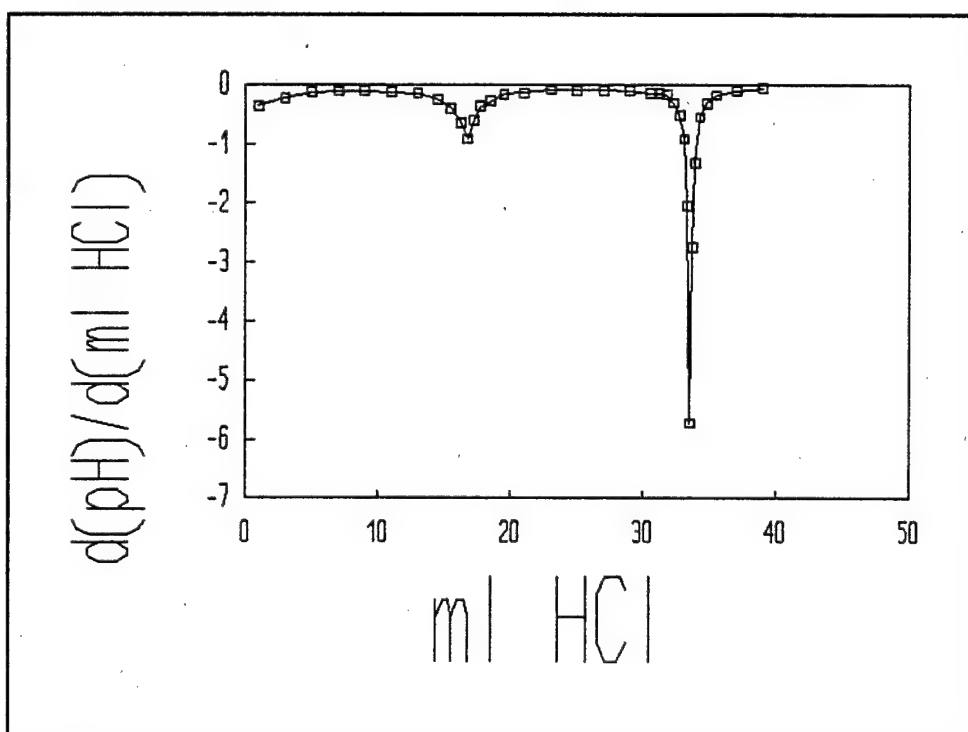


Figure C-101. First Derivative Of The Second Titration Curve For Titration Of Fresh <45 Micron Sodium Bicarbonate Media With 0.961 M HCl.

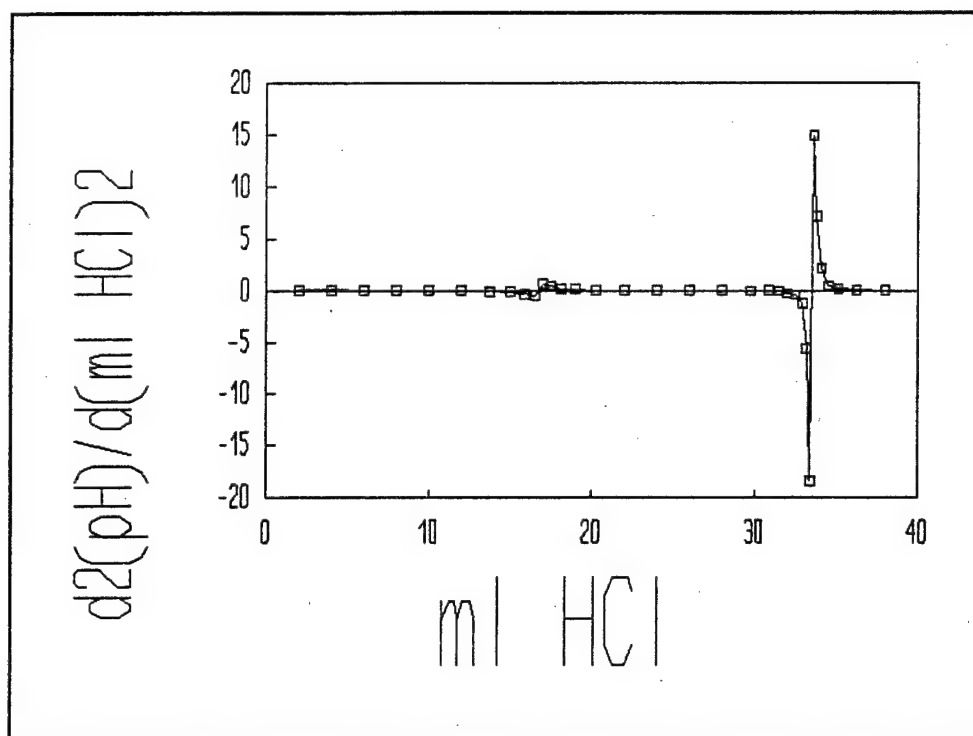


Figure C-102. Second Derivative Of The Second Titration Curve For Titration Of Fresh <45 Micron Sodium Bicarbonate Media With 0.961 M HCl.

TABLE 35. FRESH <45 MICRON SODIUM BICARBONATE MEDIA - TITRATION 3.

ml 0.961M HCl	pH	Vol (ml)	d(pH)/d(ml)	Vol (ml)	d2(pH)/d(ml) ²
0.0	11.609	1.00	-0.37	2.00	0.10
2.0	10.865	3.00	-0.18	4.00	0.02
4.0	10.507	5.00	-0.13	6.00	0.01
6.0	10.238	7.00	-0.12	8.00	0.00
8.0	10.003	9.00	-0.11	10.00	-0.01
10.0	9.780	11.00	-0.13	12.00	-0.02
12.0	9.520	13.00	-0.17	14.00	-0.08
14.0	9.178	15.00	-0.33	15.63	-0.32
16.0	8.526	16.25	-0.73	16.50	-0.25
16.5	8.162	16.75	-0.85	17.00	0.68
17.0	7.736	17.25	-0.51	17.50	0.31
17.5	7.479	17.75	-0.36	18.13	0.16
18.0	7.299	18.50	-0.24	19.25	0.06
19.0	7.057	20.00	-0.16	21.00	0.02
21.0	6.744	22.00	-0.11	23.00	0.02
23.0	6.516	24.00	-0.07	25.00	-0.00
25.0	6.385	26.00	-0.07	27.00	-0.00
27.0	6.242	28.00	-0.08	28.75	-0.03
29.0	6.089	29.50	-0.13	30.00	0.00
30.0	5.964	30.50	-0.12	31.00	-0.14
31.0	5.841	31.50	-0.27	31.88	-0.01
32.0	5.576	32.25	-0.27	32.45	-0.53
32.5	5.441	32.65	-0.48	32.78	-1.93
32.8	5.296	32.90	-0.96	33.00	-1.03
33.0	5.103	33.10	-1.17	33.20	-9.25
33.2	4.869	33.30	-3.02	33.40	-6.38
33.4	4.265	33.50	-4.30	33.60	6.65
33.6	3.406	33.70	-2.96	33.80	8.95
33.8	2.813	33.90	-1.17	34.08	1.82
34.0	2.578	34.25	-0.54	34.50	0.43
34.5	2.309	34.75	-0.32	35.13	0.17
35.0	2.148	35.50	-0.19	36.25	0.06
36.0	1.954	37.00	-0.11	38.00	0.02
38.0	1.741	39.00	-0.06	29.50	-0.01
40.0	1.623	20.00	0.04	10.00	0.00

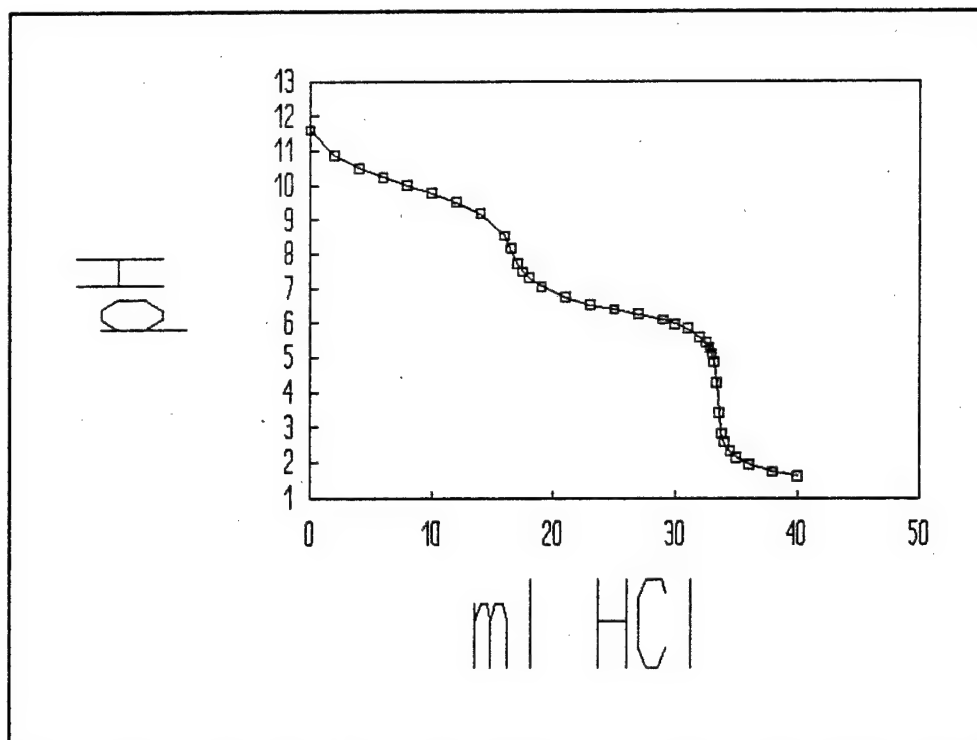


Figure C-103. Curve For The Third Titration Of Fresh <45 Micron Sodium Bicarbonate Media With 0.961 M HCl.

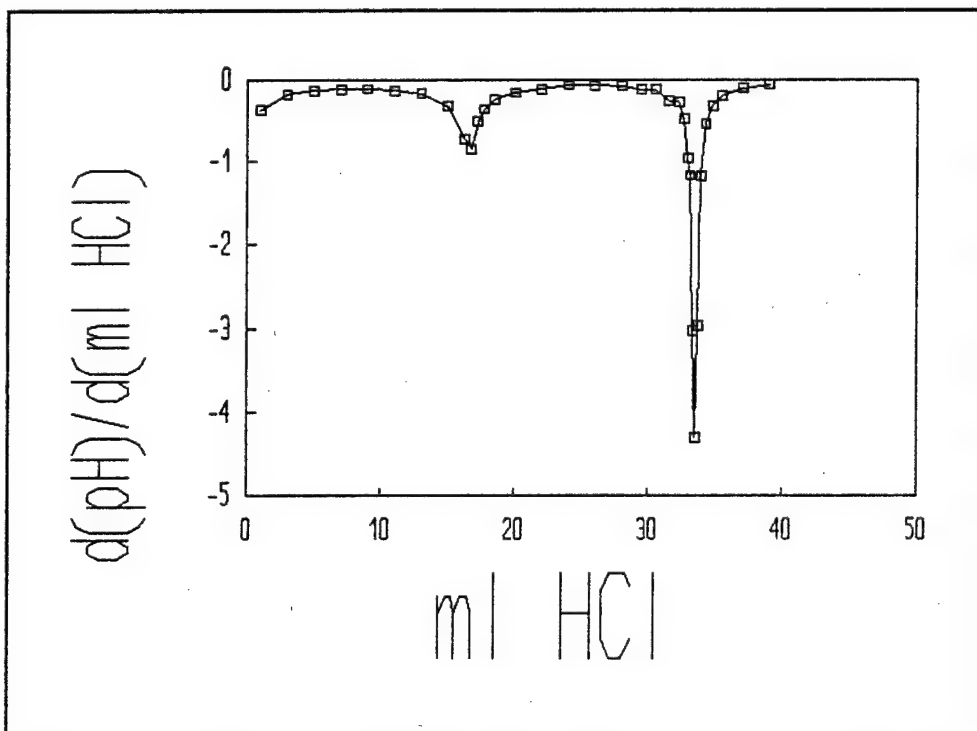


Figure C-104. First Derivative Of The Third Titration Curve For Titration Of Fresh <45 Micron Sodium Bicarbonate Media With 0.961 M HCl.

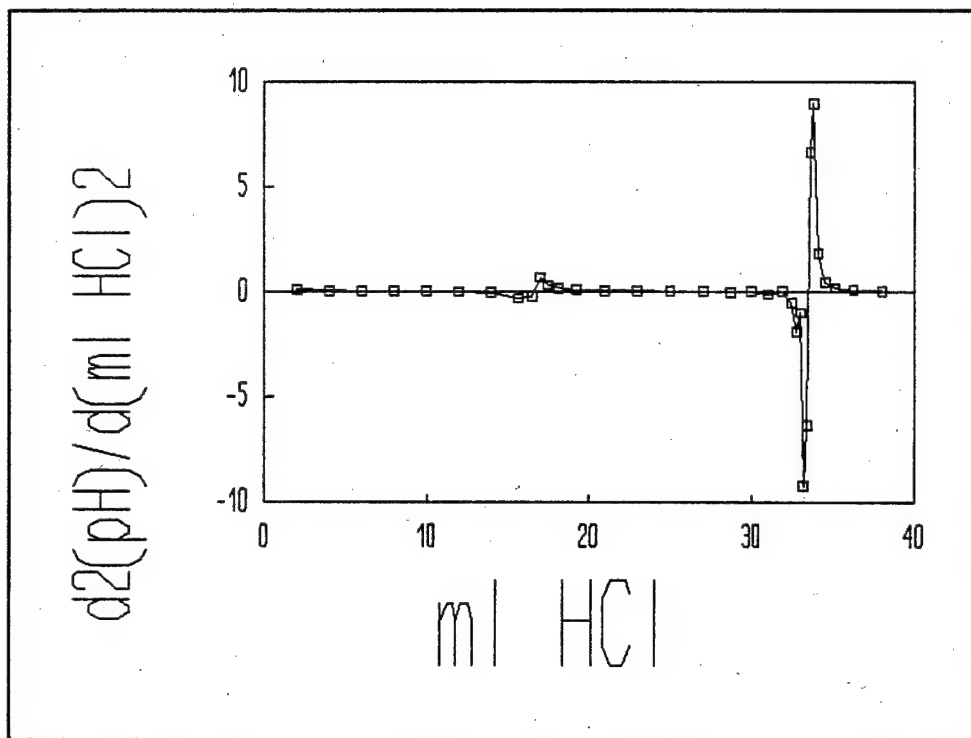


Figure C-105. Second Derivative Of The Third Titration Curve For Titration Of Fresh <45 Micron Sodium Bicarbonate Media With 0.961 M HCl.

TABLE 36. FRESH <45 MICRON SODIUM BICARBONATE MEDIA - TITRATION 4.

<u>ml 0.961M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	11.643	1.00	-0.36	2.00	0.10
2.0	10.915	3.00	-0.17	4.00	0.02
4.0	10.575	5.00	-0.14	6.00	0.01
6.0	10.301	7.00	-0.12	8.00	0.00
8.0	10.055	9.00	-0.12	10.00	0.00
10.0	9.811	11.00	-0.12	12.00	-0.01
12.0	9.568	13.00	-0.15	14.00	-0.06
14.0	9.275	15.00	-0.26	15.63	-0.24
16.0	8.759	16.25	-0.55	16.50	-0.23
16.5	8.483	16.75	-0.67	17.00	-0.71
17.0	8.149	17.25	-1.02	17.50	1.31
17.5	7.638	17.75	-0.37	18.13	0.04
18.0	7.454	18.50	-0.34	19.25	0.12
19.0	7.113	20.00	-0.17	21.00	0.03
21.0	6.779	22.00	-0.11	23.00	0.02
23.0	6.564	24.00	-0.07	25.00	-0.01
25.0	6.428	26.00	-0.09	27.00	-0.01
27.0	6.246	28.00	-0.10	29.00	-0.02
29.0	6.038	30.00	-0.14	30.75	0.06
31.0	5.762	31.50	-0.05	31.88	-0.11
32.0	5.714	32.25	-0.13	32.50	-0.44
32.5	5.647	32.75	-0.36	33.00	-0.12
33.0	5.469	33.25	-0.42	33.50	-0.54
33.5	5.261	33.75	-0.69	33.93	-3.38
34.0	4.917	34.10	-1.87	34.20	-14.52
34.2	4.543	34.30	-4.77	34.40	6.35
34.4	3.588	34.50	-3.51	34.60	12.13
34.6	2.887	34.70	-1.08	34.80	1.02
34.8	2.671	34.90	-0.87	35.08	1.13
35.0	2.496	35.25	-0.48	35.50	0.39
35.5	2.257	35.75	-0.28	36.38	0.11
36.0	2.115	37.00	-0.15	38.00	0.04
38.0	1.818	39.00	-0.08	29.50	-0.01
40.0	1.666	20.00	0.04	10.00	0.00

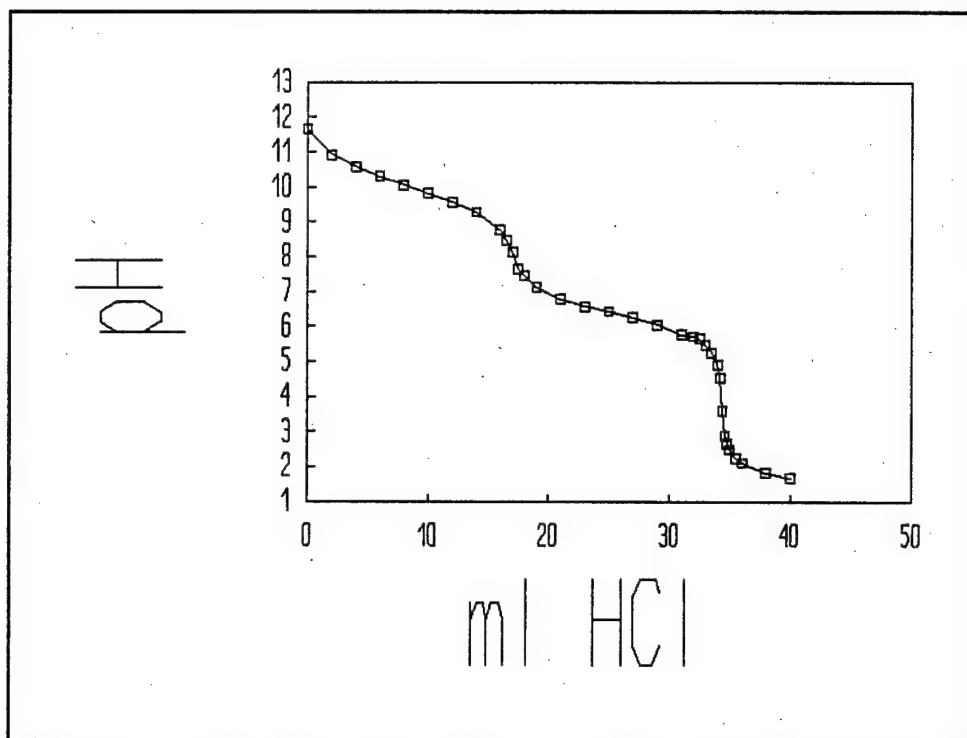


Figure C-106. Curve For The Fourth Titration Of Fresh <45 Micron Sodium Bicarbonate Media With 0.961 M HCl.

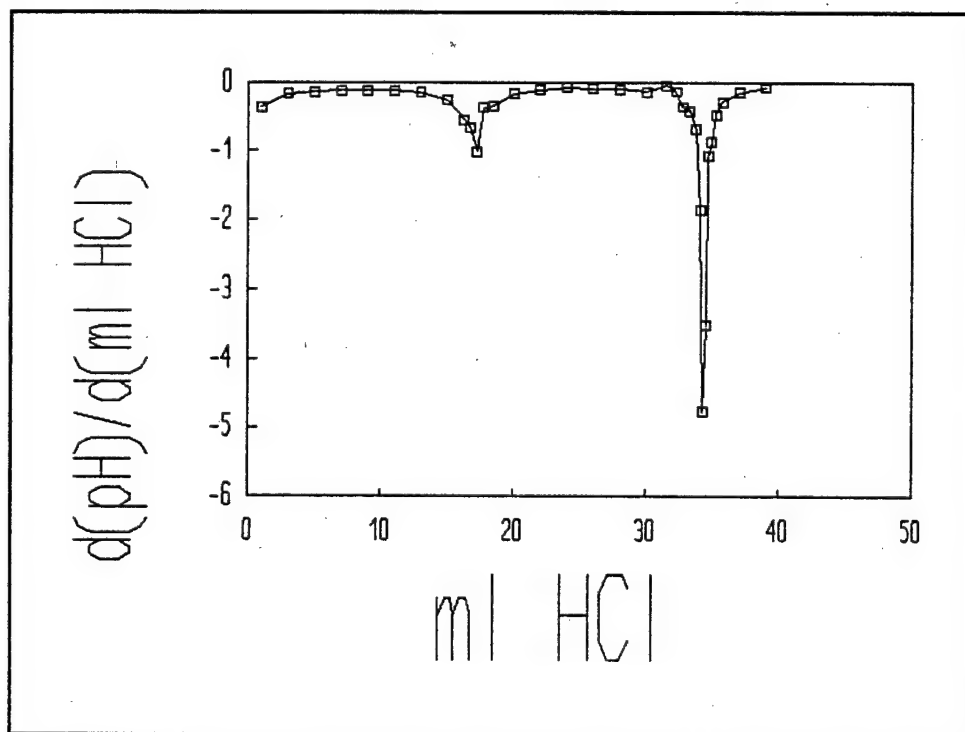


Figure C-107. First Derivative Of The Fourth Titration Curve For Titration Of Fresh <45 Micron Sodium Bicarbonate Media With 0.961 M HCl.

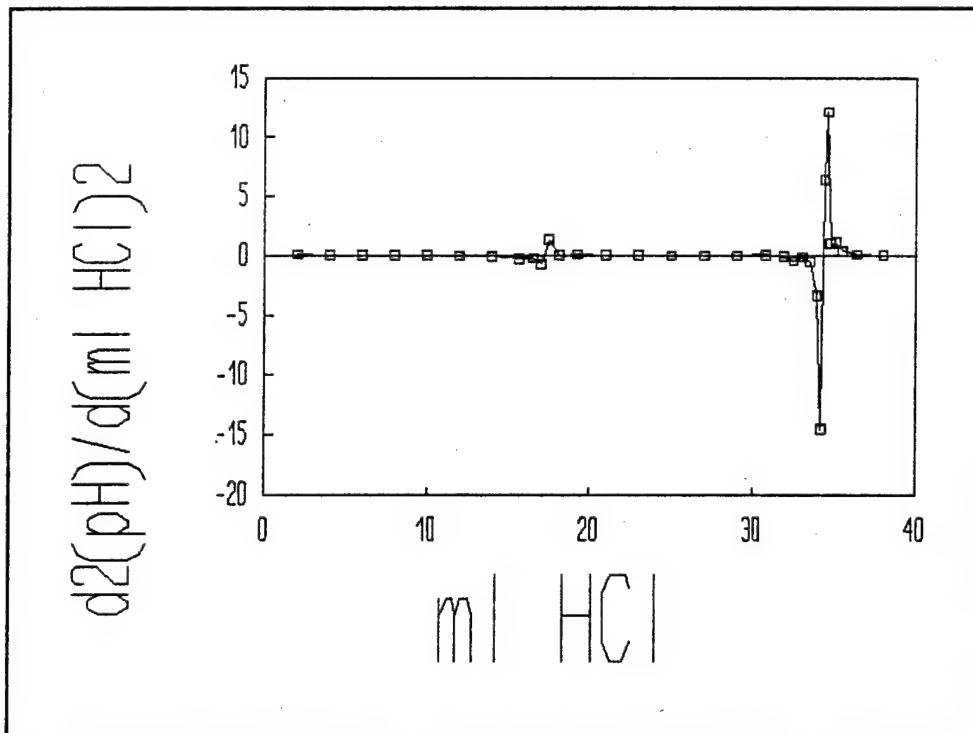


Figure C-108. Second Derivative Of The Fourth Titration Curve For Titration Of Fresh <45 Micron Sodium Bicarbonate Media With 0.961 M HCl.

TABLE 37. TITRATION OF SODIUM BICARBONATE FROM J. T. BAKER CHEMICAL CO.

<u>ml 0.961M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d²(pH)/d(ml)²</u>
0.0	11.367	1.00	-0.40	2.00	0.10
2.0	10.575	3.00	-0.20	4.00	0.04
4.0	10.170	5.00	-0.12	6.00	-0.00
6.0	9.939	7.00	-0.13	7.75	0.03
8.0	9.688	8.50	-0.08	9.00	-0.23
9.0	9.608	9.50	-0.31	10.00	0.06
10.0	9.295	10.50	-0.25	11.00	-0.13
11.0	9.043	11.50	-0.38	11.88	-1.15
12.0	8.664	12.25	-1.24	12.50	0.36
12.5	8.042	12.75	-1.06	13.00	1.04
13.0	7.511	13.25	-0.54	13.50	0.23
13.5	7.240	13.75	-0.43	14.13	0.17
14.0	7.027	14.50	-0.30	15.00	0.09
15.0	6.732	15.50	-0.21	16.25	0.02
16.0	6.524	17.00	-0.18	18.00	0.01
18.0	6.167	19.00	-0.16	19.75	-0.04
20.0	5.854	20.50	-0.22	20.88	0.05
21.0	5.636	21.25	-0.18	21.50	-0.23
21.5	5.547	21.75	-0.29	21.95	-0.15
22.0	5.401	22.15	-0.35	22.33	-0.56
22.3	5.295	22.50	-0.55	22.68	-2.32
22.7	5.075	22.85	-1.36	22.98	-10.93
23.0	4.666	23.10	-4.09	23.20	-4.50
23.2	3.847	23.30	-5.00	23.40	17.88
23.4	2.848	23.50	-1.42	23.60	3.87
23.6	2.564	23.70	-0.65	23.80	0.03
23.8	2.435	23.90	-0.64	24.08	0.82
24.0	2.307	24.25	-0.35	24.50	0.28
24.5	2.131	24.75	-0.21	25.13	0.08
25.0	2.025	25.50	-0.15	26.25	0.04
26.0	1.875	27.00	-0.08	28.00	0.04
28.0	1.705	29.00	-0.00	22.00	-0.00
30.0	1.695	15.00	0.06	7.50	0.00

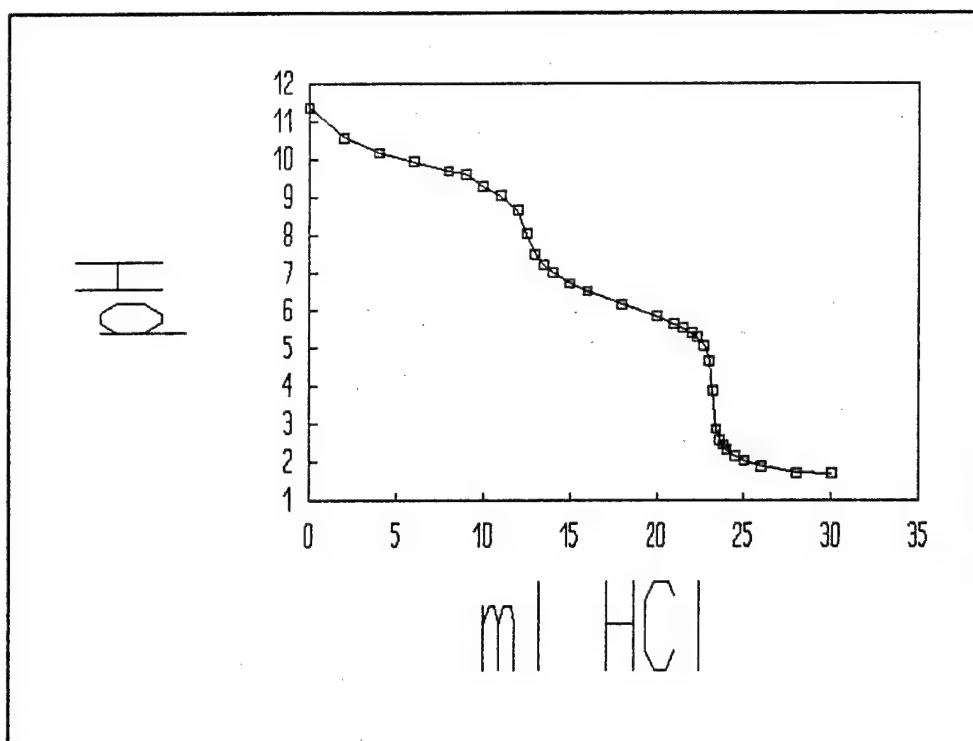


Figure C-109. Curve For The Titration Of Sodium Bicarbonate From Baker Chemical Co. With 0.961 M HCl.

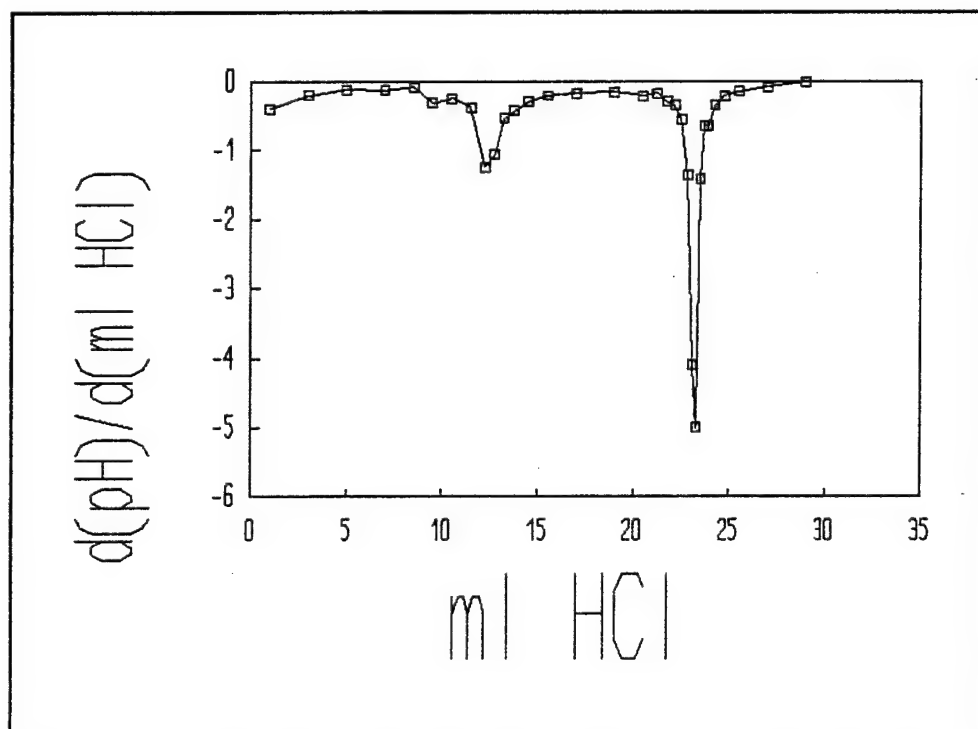


Figure C-110. First Derivative Of The Titration Curve For Titration Of Sodium Bicarbonate From Baker Chemical Co. With 0.961 M HCl.

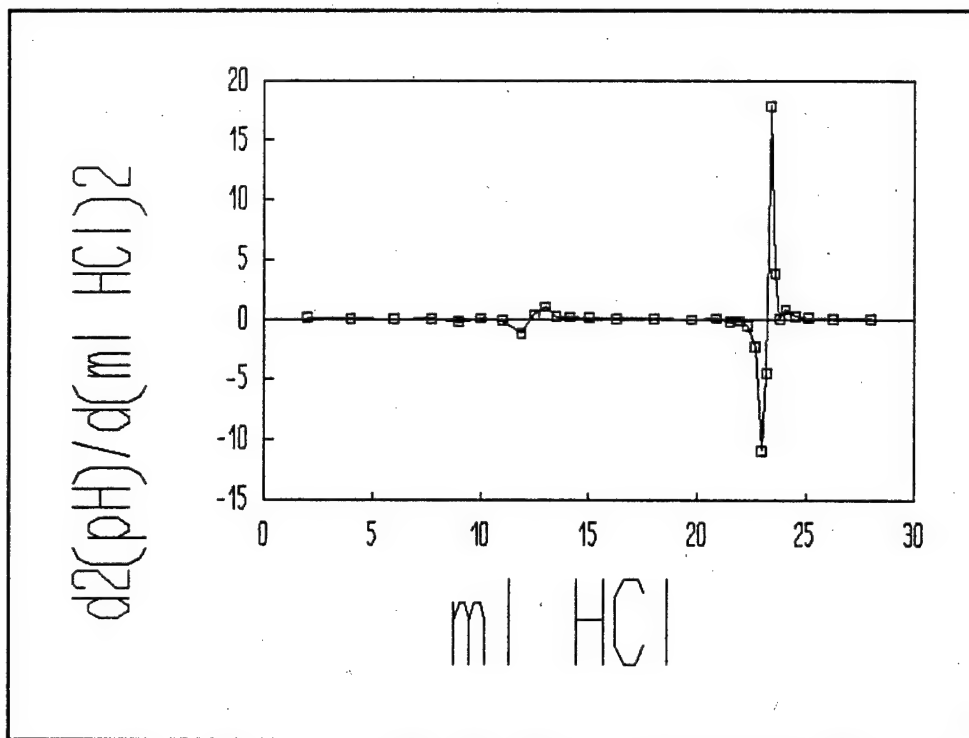


Figure C-111. Second Derivative Of The Titration Curve For Titration Of Sodium Bicarbonate From Baker Chemical Co. With 0.961 M HCl.

TABLE 38. TITRATION OF SODIUM CARBONATE FROM ALDRICH CHEMICAL CO..

<u>ml 0.961M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d²(pH)/d(ml)²</u>
0.0	11.686	1.00	-0.38	2.00	0.10
2.0	10.918	3.00	-0.19	4.00	0.02
4.0	10.530	5.00	-0.15	6.00	0.03
6.0	10.224	7.00	-0.10	8.00	-0.01
8.0	10.032	9.00	-0.11	10.00	0.00
10.0	9.813	11.00	-0.10	12.00	-0.00
12.0	9.613	13.00	-0.11	13.75	-0.02
14.0	9.399	14.50	-0.13	15.00	-0.01
15.0	9.267	15.50	-0.15	16.00	-0.07
16.0	9.122	16.50	-0.21	17.00	-0.05
17.0	8.908	17.50	-0.26	17.88	-0.33
18.0	8.646	18.25	-0.51	18.50	-0.37
18.5	8.393	18.75	-0.69	19.00	-1.12
19.0	8.047	19.25	-1.25	19.50	2.49
19.5	7.420	19.75	-0.01	20.00	-0.27
20.0	7.416	20.25	-0.14	20.50	-0.11
20.5	7.344	20.75	-0.20	21.00	0.32
21.0	7.245	21.25	-0.04	21.50	-0.54
21.5	7.225	21.75	-0.31	22.38	0.02
22.0	7.070	23.00	-0.29	24.00	0.09
24.0	6.489	25.00	-0.11	26.00	0.02
26.0	6.262	27.00	-0.08	28.00	-0.02
28.0	6.110	29.00	-0.11	29.75	0.02
30.0	5.888	30.50	-0.07	31.00	0.01
31.0	5.814	31.50	-0.07	32.00	-0.05
32.0	5.746	32.50	-0.12	33.00	-0.10
33.0	5.630	33.50	-0.21	33.88	0.10
34.0	5.419	34.25	-0.14	34.50	-0.16
34.5	5.351	34.75	-0.21	35.00	-0.16
35.0	5.244	35.25	-0.29	35.50	-0.40
35.5	5.098	35.75	-0.49	35.93	-0.83
36.0	4.853	36.10	-0.78	36.20	-4.77
36.2	4.697	36.30	-1.73	36.40	-16.93
36.4	4.350	36.50	-5.12	36.65	11.10
36.6	3.326	36.80	-1.79	37.03	2.17
37.0	2.610	37.25	-0.81	37.50	0.86
37.5	2.204	37.75	-0.38	38.13	0.24
38.0	2.013	38.50	-0.21	39.00	0.10
39.0	1.808	39.50	-0.11	29.75	-0.01
40.0	1.699	20.00	0.04	10.00	0.00

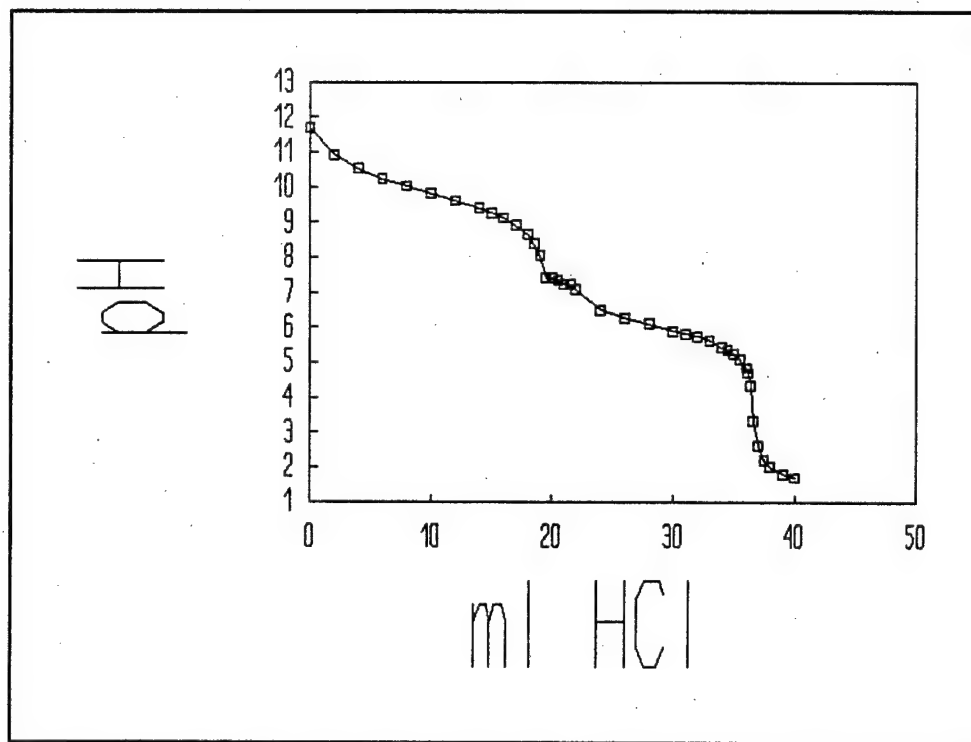


Figure C-112. Curve For The Titration Of Sodium Carbonate From Aldrich Chemical Co. With 0.961 M HCl.

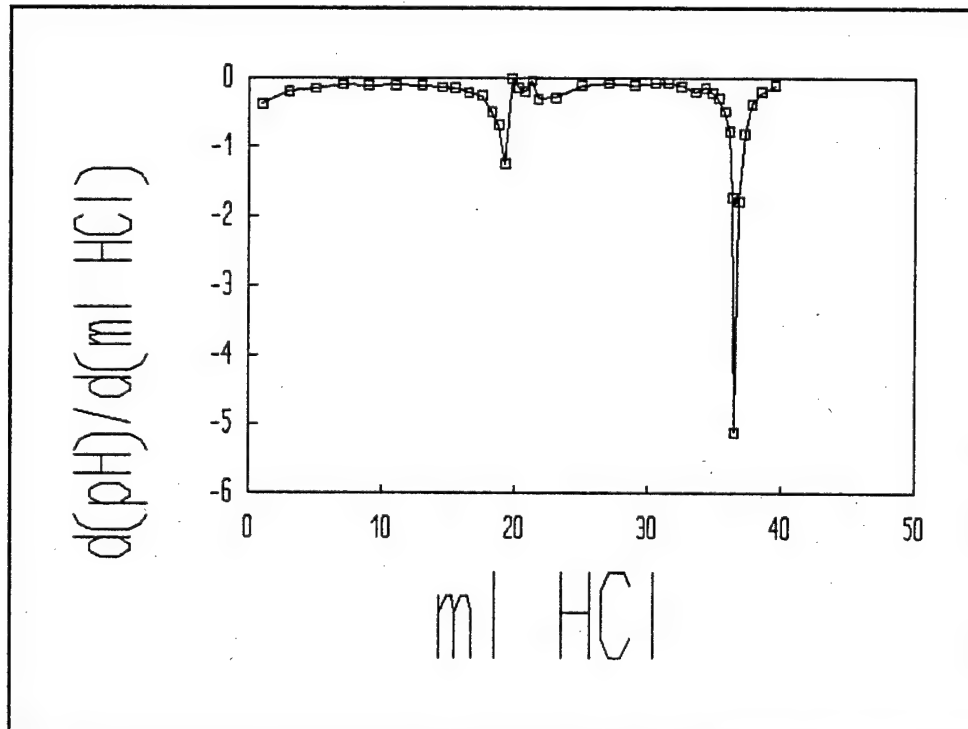


Figure C-113. First Derivative Of The Titration Curve For Titration Of Sodium Carbonate From Aldrich Chemical Co. With 0.961 M HCl.

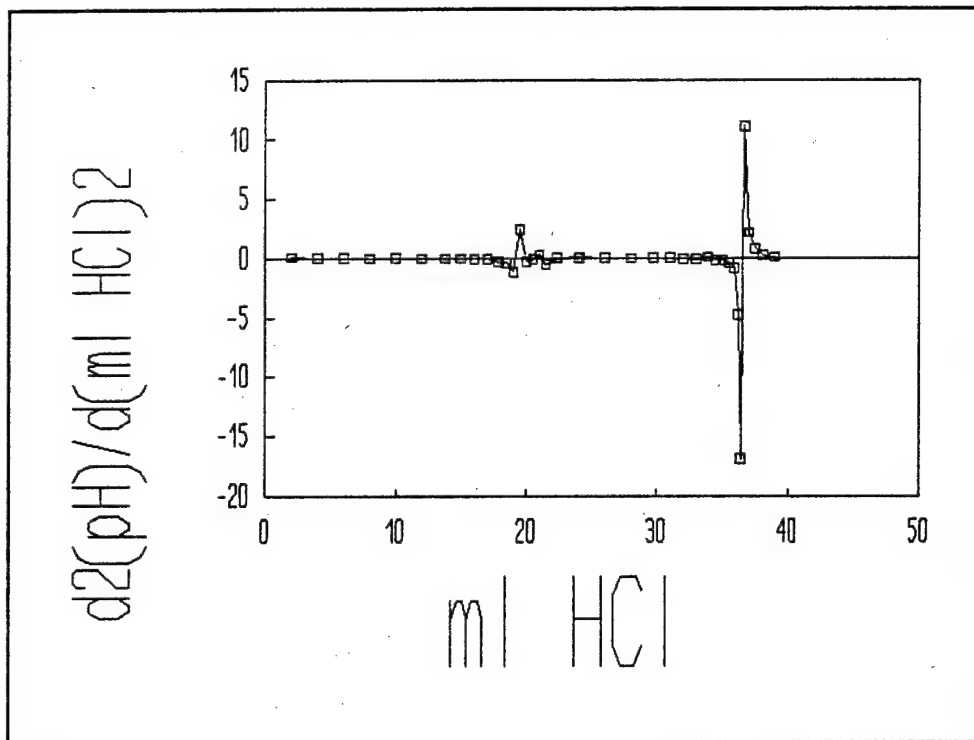


Figure C-114. Second Derivative Of The Titration Curve For Titration Of Sodium Carbonate From Aldrich Chemical Co. With 0.961 M HCl.

TABLE 39. TOTAL SPENT SODIUM BICARBONATE MEDIA - TITRATION 1.

<u>ml 0.984M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	11.497	0.50	-0.51	1.00	0.28
1.0	10.984	1.50	-0.24	2.05	0.04
2.0	10.746	2.60	-0.19	3.10	0.02
3.2	10.512	3.60	-0.17	4.05	0.04
4.0	10.375	4.50	-0.14	5.00	0.01
5.0	10.240	5.50	-0.12	6.00	0.02
6.0	10.118	6.50	-0.11	7.00	0.00
7.0	10.011	7.50	-0.11	8.00	0.01
8.0	9.905	8.50	-0.10	9.00	0.09
9.0	9.804	9.50	-0.01	10.00	-0.19
10.0	9.798	10.50	-0.19	11.00	0.06
11.0	9.606	11.50	-0.13	12.00	0.03
12.0	9.478	12.50	-0.10	13.00	-0.03
13.0	9.376	13.50	-0.13	14.00	-0.04
14.0	9.242	14.50	-0.18	15.00	-0.00
15.0	9.065	15.50	-0.18	15.88	-0.26
16.0	8.885	16.25	-0.37	16.50	0.08
16.5	8.699	16.75	-0.33	17.00	-0.35
17.0	8.534	17.25	-0.51	17.50	-0.80
17.5	8.281	17.75	-0.91	18.00	0.52
18.0	7.827	18.25	-0.65	18.50	0.33
18.5	7.504	18.75	-0.48	19.00	0.38
19.0	7.264	19.25	-0.29	19.50	0.16
19.5	7.119	19.75	-0.21	20.13	0.03
20.0	7.014	20.50	-0.19	21.00	0.03
21.0	6.824	21.50	-0.16	22.00	0.04
22.0	6.666	22.50	-0.12	23.00	0.01
23.0	6.544	23.50	-0.11	24.00	0.02
24.0	6.436	24.50	-0.09	25.00	0.02
25.0	6.349	25.50	-0.07	26.00	-0.00
26.0	6.282	26.50	-0.07	27.00	0.01
27.0	6.214	27.50	-0.06	28.00	-0.02
28.0	6.154	28.50	-0.08	29.00	0.02
29.0	6.074	29.50	-0.06	30.00	-0.02
30.0	6.015	30.50	-0.08	31.00	-0.01
31.0	5.932	31.50	-0.09	31.88	-0.34
32.0	5.842	32.25	-0.35	32.50	0.02
32.5	5.668	32.75	-0.34	33.13	0.53
33.0	5.499	33.50	0.06	33.88	-0.51
34.0	5.555	34.25	-0.33	34.50	-0.66
34.5	5.391	34.75	-0.66	35.00	-2.10
35.0	5.063	35.25	-1.70	35.43	-11.03
35.5	4.211	35.60	-5.56	35.68	19.30
35.7	3.098	35.75	-2.67	35.80	8.10
35.8	2.831	35.85	-1.86	35.90	2.60
35.9	2.645	35.95	-1.60	36.03	6.13
36.0	2.485	36.10	-0.68	36.20	0.67

TABLE 39. TOTAL SPENT SODIUM BICARBONATE MEDIA - TITRATION 1 (continued).

<u>ml 0.984M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d²(pH)/d(ml)²</u>
36.2	2.349	36.30	-0.54	36.43	0.45
36.4	2.240	36.55	-0.43	36.70	0.38
36.7	2.110	36.85	-0.32	37.05	0.18
37.0	2.014	37.25	-0.25	37.50	0.15
37.5	1.891	37.75	-0.17	38.13	0.07
38.0	1.806	38.50	-0.12	39.00	0.02
39.0	1.690	39.50	-0.10	40.00	0.04
40.0	1.594	40.50	-0.06	41.00	0.00
41.0	1.534	41.50	-0.06	42.00	0.01
42.0	1.476	42.50	-0.05	32.00	-0.00
43.0	1.431	21.50	0.03	10.75	0.00

NOTE: This sample was taken from the first batch of spent media which was dried in the oven before being broken into size fractions. The spent media dried into a hard cake causing extensive work to break down into particle sizes.

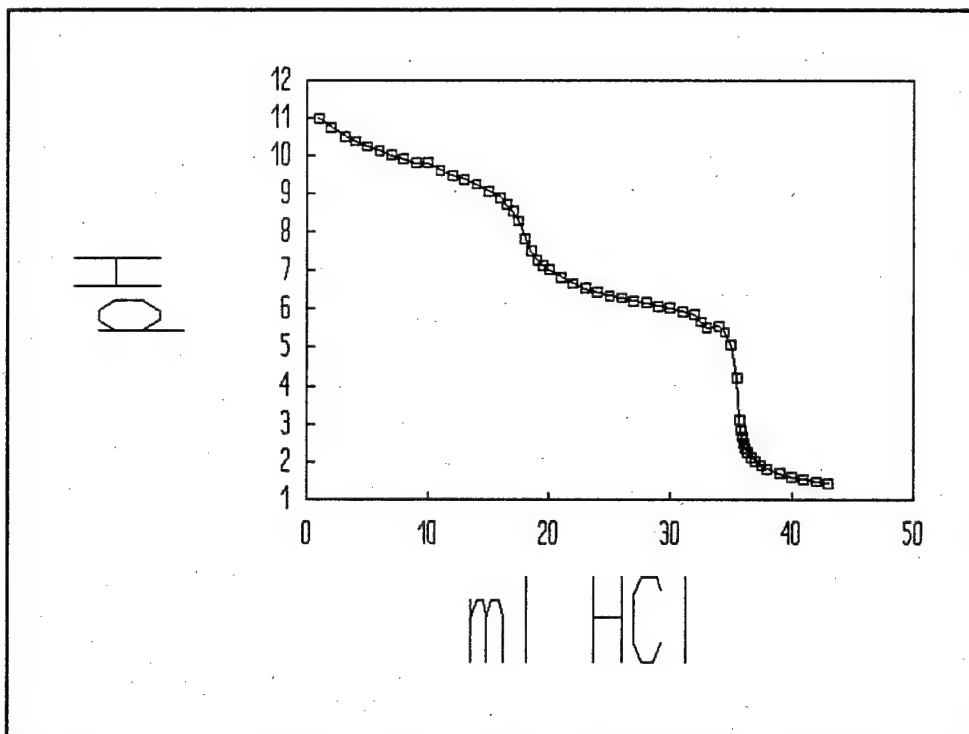


Figure C-115. Curve For The First Titration Of Total Spent Sodium Bicarbonate Media With 0.984 M HCl.

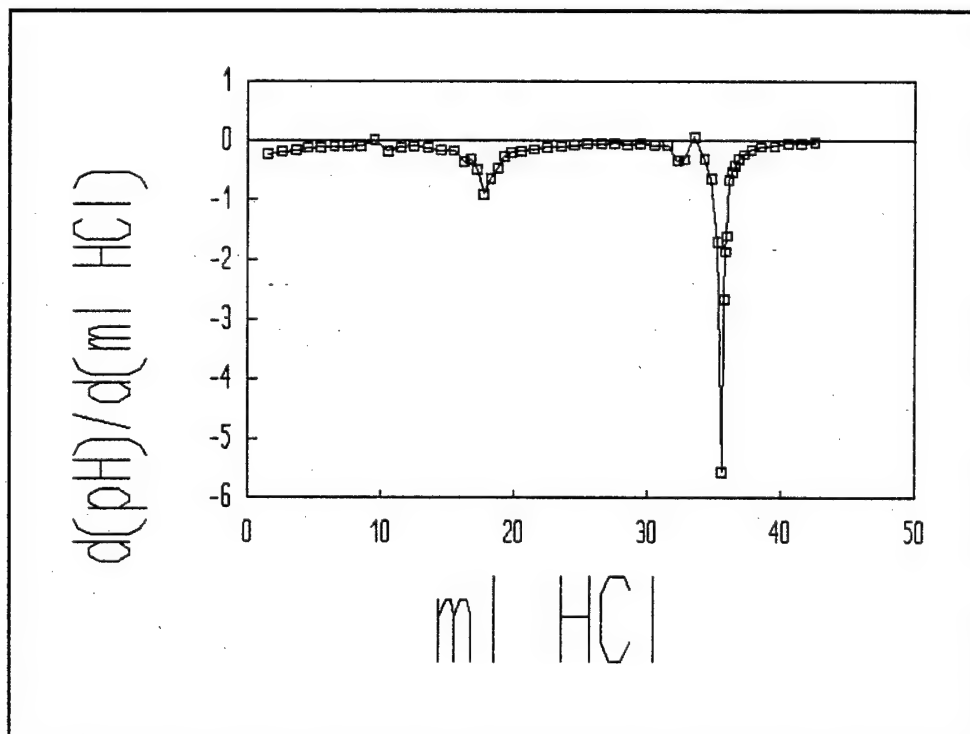


Figure C-116. First Derivative Of The First Titration Curve For Titration Of Total Spent Sodium Bicarbonate Media With 0.984 M HCl.

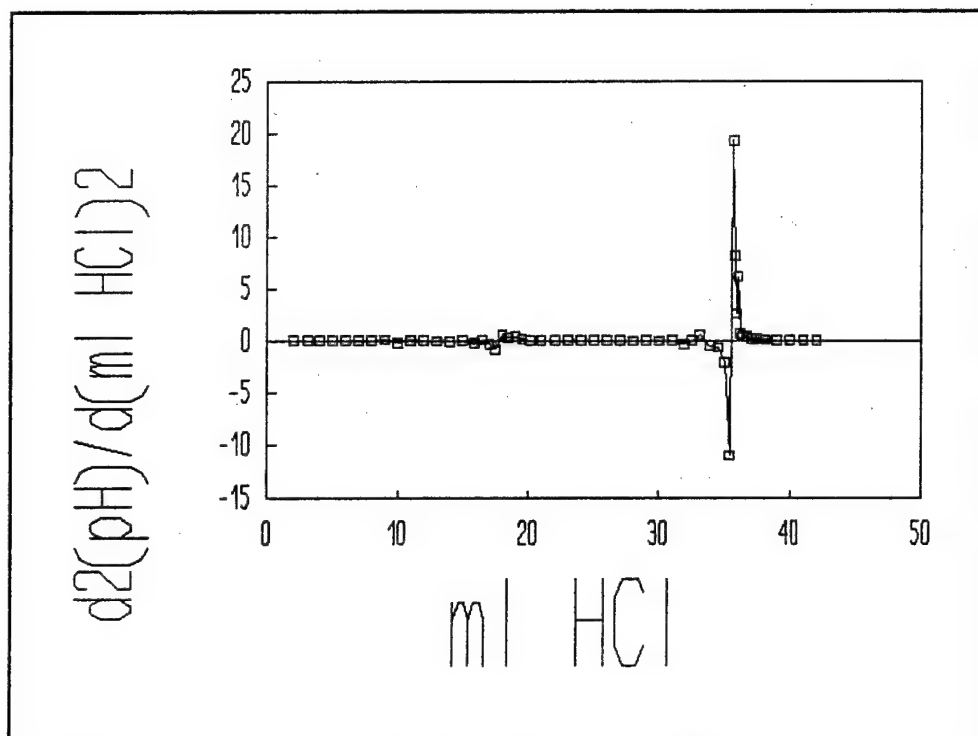


Figure C-117. Second Derivative Of The First Titration Curve For Titration Of Total Spent Sodium Bicarbonate Media With 0.984 M HCl.

TABLE 40. TOTAL SPENT SODIUM BICARBONATE MEDIA - TITRATION 2.

<u>ml 0.984M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d²(pH)/d(ml)²</u>
0.0	11.652	0.05	-0.57	1.00	0.25
1.0	11.086	1.50	-0.32	2.00	0.13
2.0	10.771	2.50	-0.19	3.00	0.01
3.0	10.585	3.50	-0.18	4.00	0.06
4.0	10.405	4.50	-0.13	5.00	-0.01
5.0	10.280	5.50	-0.13	6.00	0.01
6.0	10.149	6.50	-0.12	7.00	0.02
7.0	10.029	7.50	-0.10	8.00	-0.01
8.0	9.930	8.50	-0.11	9.00	0.02
9.0	9.822	9.50	-0.09	10.00	-0.03
10.0	9.733	10.50	-0.12	11.00	0.02
11.0	9.612	11.50	-0.10	12.00	-0.03
12.0	9.512	12.50	-0.13	13.00	-0.01
13.0	9.381	13.50	-0.14	14.00	-0.02
14.0	9.244	14.50	-0.16	15.00	-0.07
15.0	9.084	15.50	-0.23	15.88	-0.01
16.0	8.853	16.25	-0.24	16.50	-0.30
16.5	8.735	16.75	-0.39	17.00	0.76
17.0	8.542	17.25	-0.01	17.50	-3.16
17.5	8.538	17.75	-1.59	18.00	1.97
18.0	7.743	18.25	-0.61	18.50	0.48
18.5	7.440	18.75	-0.36	19.00	0.06
19.0	7.258	19.25	-0.33	19.50	0.22
19.5	7.092	19.75	-0.22	20.13	0.04
20.0	6.981	20.50	-0.19	21.00	0.03
21.0	6.787	21.50	-0.17	22.00	0.08
22.0	6.621	22.50	-0.09	23.00	-0.01
23.0	6.533	23.50	-0.10	24.00	0.00
24.0	6.435	24.50	-0.10	25.00	0.02
25.0	6.337	25.50	-0.08	26.00	0.01
26.0	6.256	26.50	-0.07	27.00	0.00
27.0	6.190	27.50	-0.07	28.00	0.01
28.0	6.124	28.50	-0.05	29.00	-0.04
29.0	6.070	29.50	-0.09	30.00	0.00
30.0	5.981	30.50	-0.09	30.88	0.00
31.0	5.895	31.25	-0.08	31.50	0.05
31.5	5.853	31.75	-0.06	32.00	-0.00
32.0	5.824	32.25	-0.06	32.50	0.24
32.5	5.794	32.75	0.06	33.13	-0.44
33.0	5.823	33.50	-0.27	33.88	0.36
34.0	5.551	34.25	-0.00	34.50	-1.67
34.5	5.549	34.75	-0.84	34.93	1.44
35.0	5.130	35.10	-0.33	35.22	-3.18
35.2	5.063	35.35	-1.13	35.50	-10.63
35.5	4.724	35.65	-4.32	35.78	3.62
35.8	3.428	35.90	-3.41	36.03	9.22
36.0	2.745	36.15	-1.11	36.28	1.78

TABLE 40. TOTAL SPENT SODIUM BICARBONATE MEDIA - TITRATION 2 (continued).

<u>ml 0.984M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d²(pH)/d(ml)²</u>
36.3	2.412	36.40	-0.66	36.53	0.85
36.5	2.279	36.65	-0.45	36.78	-0.25
36.8	2.143	36.90	-0.51	37.20	0.49
37.0	2.040	37.50	-0.22	38.00	0.10
38.0	1.818	38.50	-0.12	39.00	0.02
39.0	1.699	39.50	-0.10	40.00	0.02
40.0	1.604	40.50	-0.08	41.00	0.02
41.0	1.526	41.50	-0.06	42.00	-0.00
42.0	1.468	42.50	-0.06	32.00	-0.00
43.0	1.409	21.50	0.03	10.75	0.00

NOTE: This sample was taken from the first batch of spent media which was dried in the oven before being broken into size fractions. The spent media dried into a hard cake causing extensive work to break down into particle sizes.

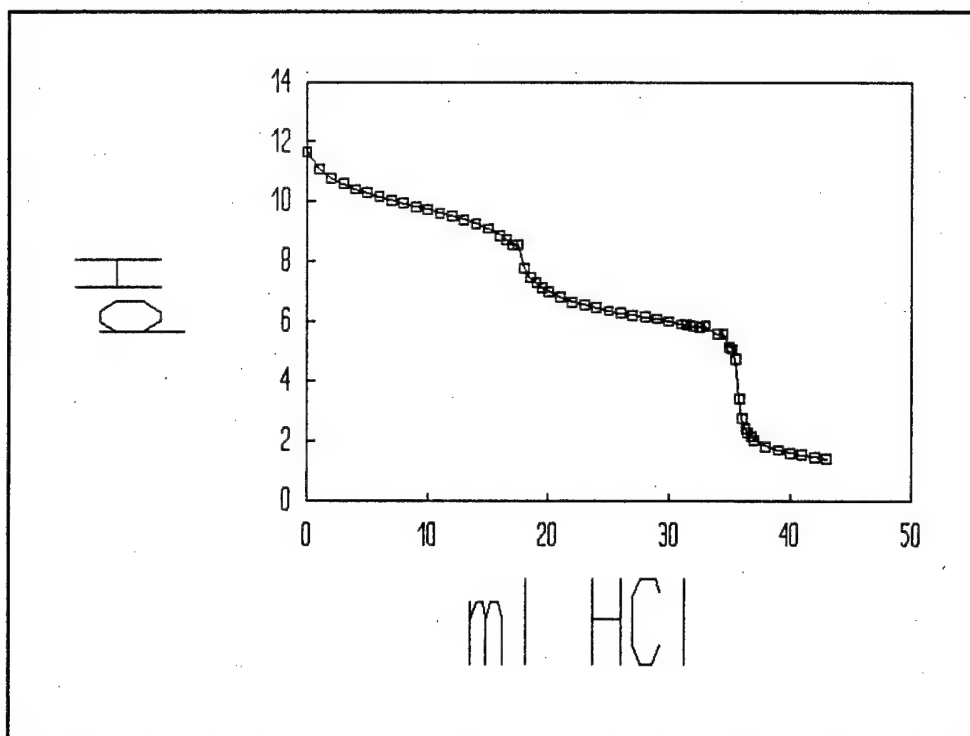


Figure C-118. Curve For The Second Titration Of Total Spent Sodium Bicarbonate Media With 0.984 M HCl.

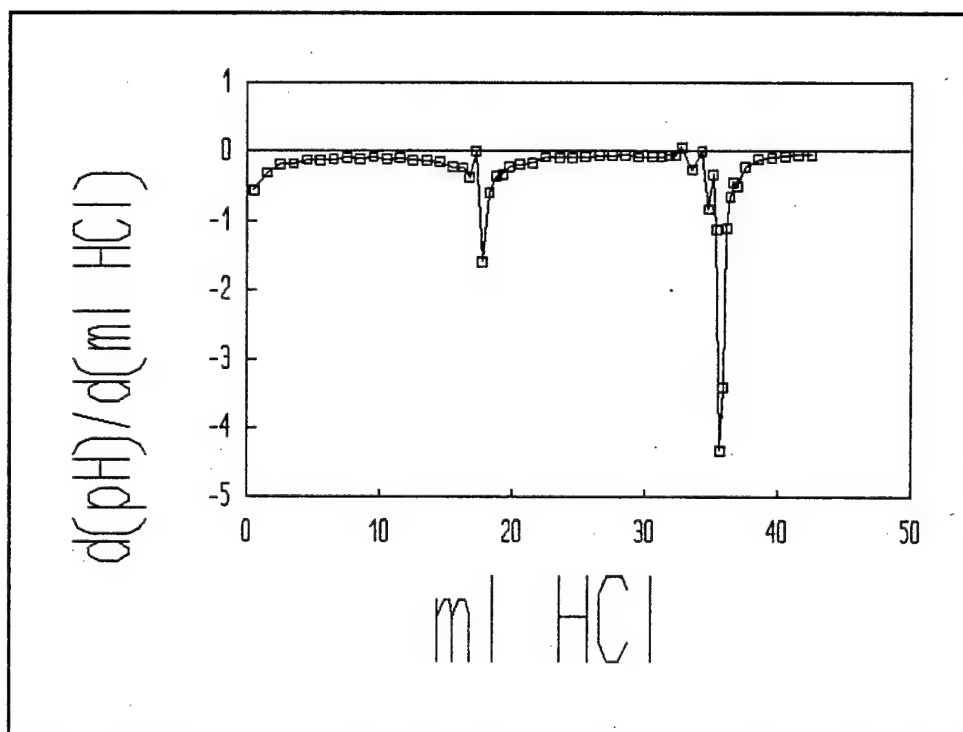


Figure C-119. First Derivative Of The Second Titration Curve For Titration Of Total Spent Sodium Bicarbonate Media With 0.984 M HCl.

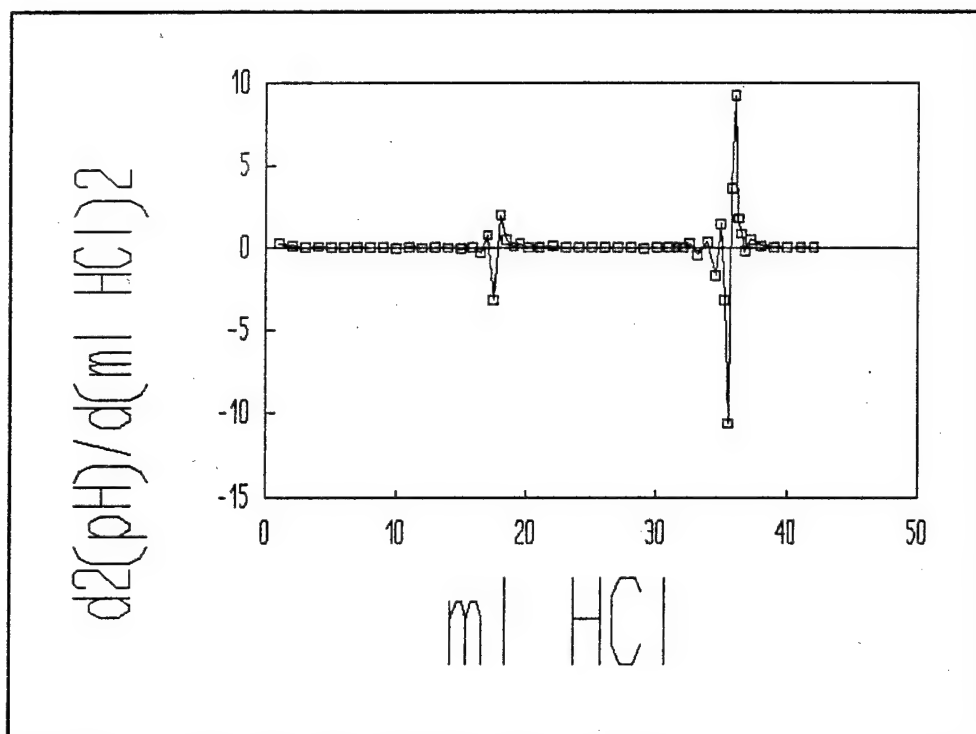


Figure C-120. Second Derivative Of The Second Titration Curve For Titration Of Total Spent Sodium Bicarbonate Media With 0.984 M HCl .

TABLE 41. TOTAL SPENT SODIUM BICARBONATE MEDIA - TITRATION 3.

<u>ml 0.984M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	9.732	0.50	-0.09	1.00	-0.04
1.0	9.637	1.50	-0.14	2.00	0.07
2.0	9.499	2.50	-0.07	3.00	-0.07
3.0	9.426	3.50	-0.14	4.00	-0.10
4.0	9.285	4.50	-0.24	5.00	-0.42
5.0	9.045	5.50	-0.66	5.88	0.47
6.0	8.385	6.25	-0.31	6.50	-0.23
6.5	8.232	6.75	-0.42	7.00	-0.15
7.0	8.022	7.25	-0.49	7.50	6.47
7.5	7.775	7.75	2.74	8.13	-3.82
8.0	9.146	8.50	-0.12	9.00	-0.30
9.0	9.025	9.50	-0.42	9.88	-1.61
10.0	8.604	10.25	-1.63	10.50	2.19
10.5	7.788	10.75	-0.54	11.00	-0.01
11.0	7.520	11.25	-0.54	11.50	0.77
11.5	7.249	11.75	-0.16	12.00	-0.14
12.0	7.171	12.25	-0.23	12.50	0.42
12.5	7.057	12.75	-0.02	13.00	-0.64
13.0	7.047	13.25	-0.34	13.50	0.51
13.5	6.878	13.75	-0.08	14.13	-0.07
14.0	6.837	14.50	-0.14	15.00	0.01
15.0	6.702	15.50	-0.12	16.00	0.01
16.0	6.578	16.50	-0.11	17.00	0.03
17.0	6.468	17.50	-0.08	18.00	-0.02
18.0	6.392	18.50	-0.10	19.00	0.03
19.0	6.294	19.50	-0.07	20.00	-0.01
20.0	6.223	20.50	-0.08	21.00	0.00
21.0	6.140	21.50	-0.08	22.00	-0.02
22.0	6.060	22.50	-0.10	23.00	-0.02
23.0	5.964	23.50	-0.11	23.83	0.05
24.0	5.853	24.15	-0.08	24.28	0.21
24.3	5.830	24.40	-0.03	24.53	-0.25
24.5	5.825	24.65	-0.09	24.78	-1.39
24.8	5.799	24.90	-0.43	25.05	1.39
25.0	5.712	25.20	-0.02	25.40	-0.44
25.4	5.705	25.60	-0.19	25.80	-0.11
25.8	5.627	26.00	-0.24	26.20	-0.19
26.2	5.531	26.40	-0.32	26.60	-0.01
26.6	5.405	26.80	-0.32	27.03	-0.64
27.0	5.278	27.25	-0.61	27.50	-6.81
27.5	4.975	27.75	-4.01	27.95	5.72
28.0	2.970	28.15	-1.72	28.28	5.28
28.3	2.454	28.40	-0.40	28.50	-0.97
28.5	2.374	28.60	-0.59	28.73	0.81
28.7	2.255	28.85	-0.39	29.00	0.14
29.0	2.137	29.15	-0.35	29.28	0.22
29.3	2.032	29.40	-0.29	29.50	0.77

TABLE 41. TOTAL SPENT SODIUM BICARBONATE MEDIA - TITRATION 3 (continued).

<u>ml 0.984M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d²(pH)/d(ml)²</u>
29.5	1.973	29.60	-0.14	29.73	-0.45
29.7	1.945	29.85	-0.25	30.18	0.16
30.0	1.869	30.50	-0.15	31.00	0.05
31.0	1.718	31.50	-0.10	32.00	0.01
32.0	1.621	32.50	-0.09	33.00	0.02
33.0	1.534	33.50	-0.06	34.00	0.00
34.0	1.470	34.50	-0.06	26.00	-0.01
35.0	1.407	17.50	0.04	8.75	0.00

NOTE: This sample was taken from the second batch of spent media which was broken into size fractions as it dried. This approach greatly reduced the time required to break down the media into particle sizes.

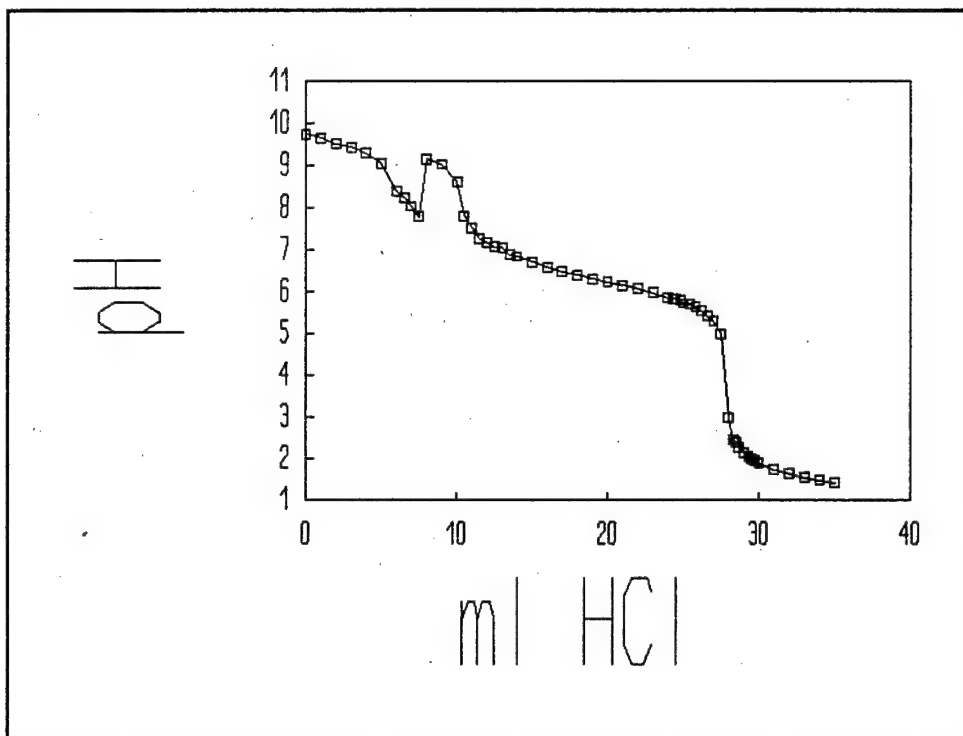


Figure C-121. Curve For The Third Titration Of Total Spent Sodium Bicarbonate Media With 0.984 M HCl.

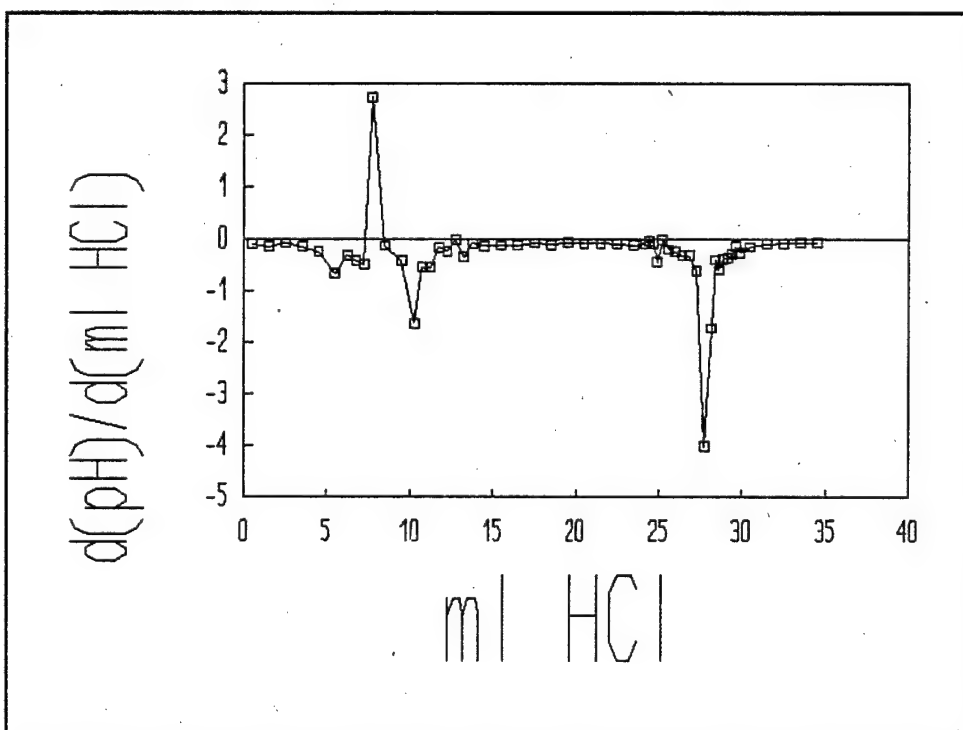


Figure C-122. First Derivative Of The Third Titration Curve For Titration Of Total Spent Sodium Bicarbonate Media With 0.984 M HCl.

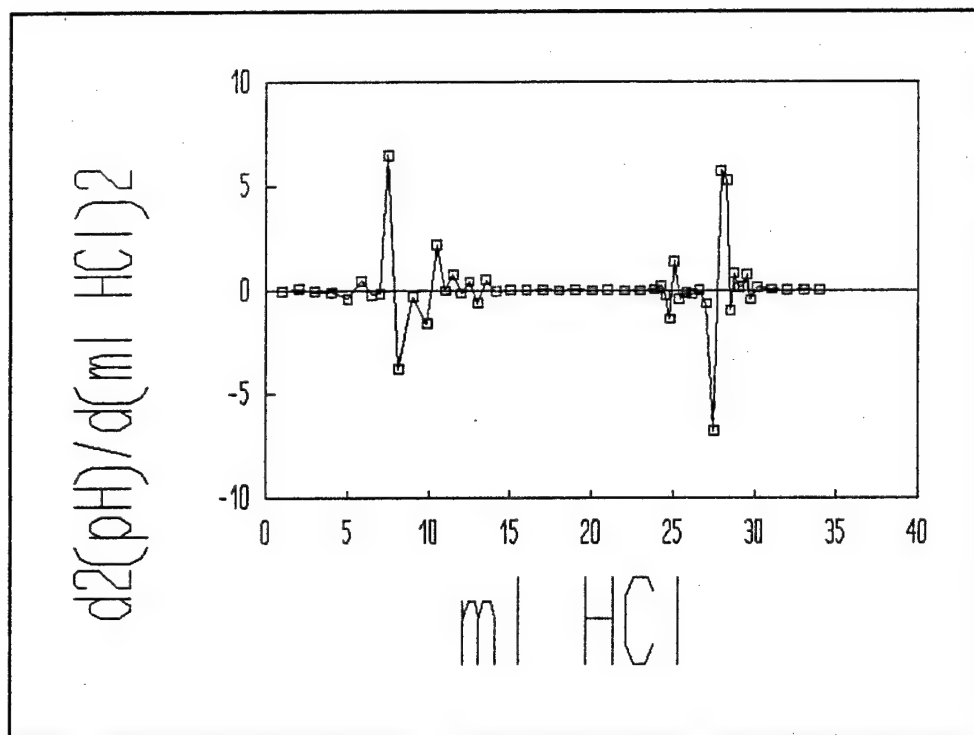


Figure C-123. Second Derivative Of The Third Titration Curve For Titration Of Total Spent Sodium Bicarbonate Media With 0.984 M HCl.

TABLE 42. TOTAL SPENT SODIUM BICARBONATE MEDIA - TITRATION 4.

<u>ml 0.984M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	9.987	0.50	-0.03	1.00	-0.07
1.0	9.959	1.50	-0.10	2.00	-0.03
2.0	9.857	2.50	-0.13	3.00	0.03
3.0	9.723	3.50	-0.11	4.00	-0.02
4.0	9.618	4.50	-0.12	5.00	-0.01
5.0	9.497	5.50	-0.13	6.00	-0.02
6.0	9.368	6.50	-0.15	7.00	-0.07
7.0	9.219	7.50	-0.22	8.00	-0.13
8.0	9.004	8.50	-0.34	8.88	-0.33
9.0	8.663	9.25	-0.59	9.50	-0.67
9.5	8.368	9.75	-0.93	10.00	0.72
10.0	7.905	10.25	-0.57	10.50	0.05
10.5	7.622	10.75	-0.54	11.00	0.40
11.0	7.351	11.25	-0.34	11.50	0.28
11.5	7.180	11.75	-0.20	12.00	-0.08
12.0	7.079	12.25	-0.24	12.63	0.11
12.5	6.957	13.00	-0.16	13.50	0.06
13.5	6.792	14.00	-0.10	14.50	0.00
14.5	6.691	15.00	-0.10	15.50	0.03
15.5	6.594	16.00	-0.07	16.50	-0.01
16.5	6.528	17.00	-0.08	17.50	-0.03
17.5	6.452	18.00	-0.10	18.50	0.05
18.5	6.350	19.00	-0.05	19.50	-0.05
19.5	6.297	20.00	-0.10	20.50	0.02
20.5	6.199	21.00	-0.08	21.50	-0.01
21.5	6.118	22.00	-0.09	22.50	-0.01
22.5	6.031	23.00	-0.09	23.50	-0.02
23.5	5.938	24.00	-0.11	24.33	0.02
24.5	5.828	24.65	-0.10	24.78	0.80
24.8	5.798	24.90	0.10	25.08	-0.83
25.0	5.818	25.25	-0.19	25.50	0.42
25.5	5.723	25.75	0.02	26.00	-0.94
26.0	5.733	26.25	-0.45	26.43	0.54
26.5	5.509	26.60	-0.26	26.73	1.20
26.7	5.457	26.85	0.04	27.00	-2.86
27.0	5.469	27.15	-0.82	27.28	1.01
27.3	5.224	27.40	-0.56	27.50	2.97
27.5	5.111	27.60	0.03	27.73	-6.39
27.7	5.117	27.85	-1.57	27.98	-10.35
28.0	4.647	28.10	-4.15	28.20	-0.98
28.2	3.816	28.30	-4.35	28.40	12.85
28.4	2.946	28.50	-1.78	28.60	4.25
28.6	2.590	28.70	-0.93	28.80	1.55
28.8	2.404	28.90	-0.62	29.08	0.62
29.0	2.280	29.25	-0.40	29.50	0.37
29.5	2.078	29.75	-0.22	30.00	0.08

TABLE 42. TOTAL SPENT SODIUM BICARBONATE MEDIA - TITRATION 4 (continued).

<u>ml 0.984M HCl</u>	<u>pH</u>	<u>Vol. (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d²(pH)/d(ml)²</u>
30.0	1.969	30.25	-0.18	30.50	0.10
30.5	1.879	30.75	-0.13	31.13	0.05
31.0	1.814	31.50	-0.10	32.00	0.02
32.0	1.719	32.50	-0.07	33.00	0.00
33.0	1.647	33.50	-0.07	34.00	0.02
34.0	1.579	34.50	-0.05	26.00	-0.01
35.0	1.527	17.50	0.04	8.75	0.00

NOTE: This sample was taken from the second batch of spent media which was broken into size fractions as it dried. This approach greatly reduced the time required to break down the media into particle sizes.

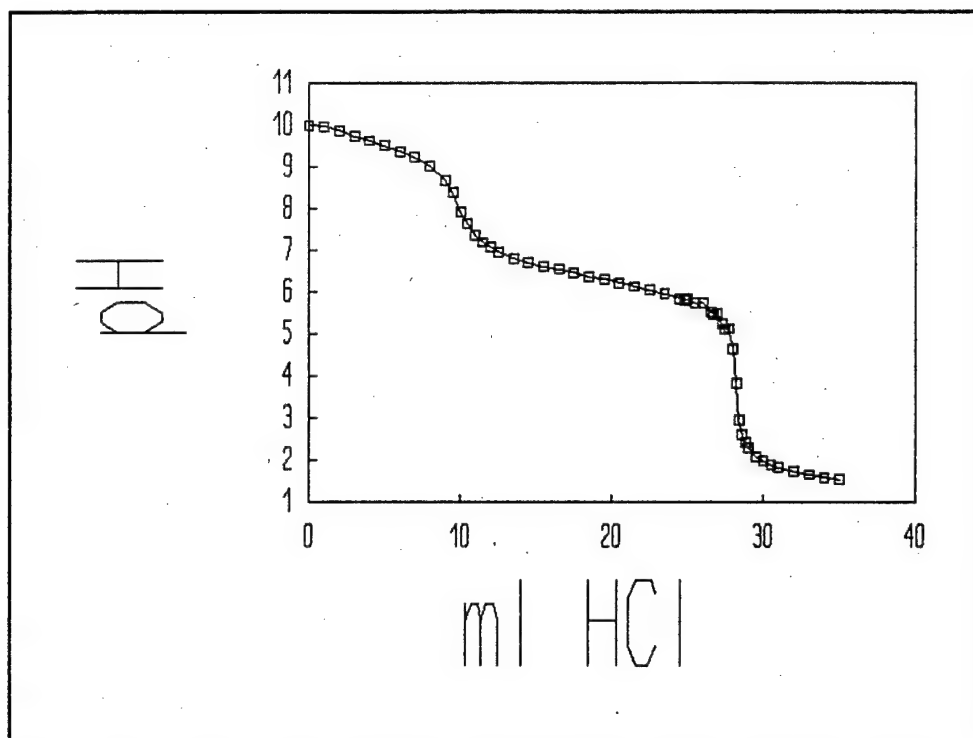


Figure C-124. Curve For The Fourth Titration Of Total Spent Sodium Bicarbonate Media With 0.984 M HCl.

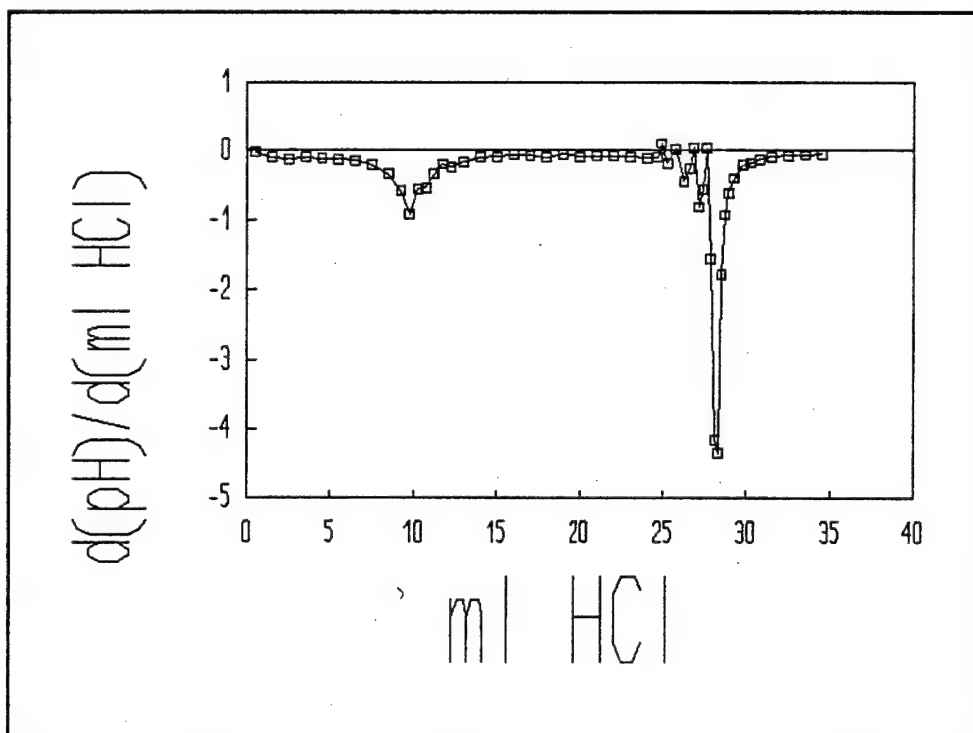


Figure C-125. First Derivative Of The Forth Titration Curve For Titration Of Total Spent Sodium Bicarbonate Media With 0.984 M HCl.

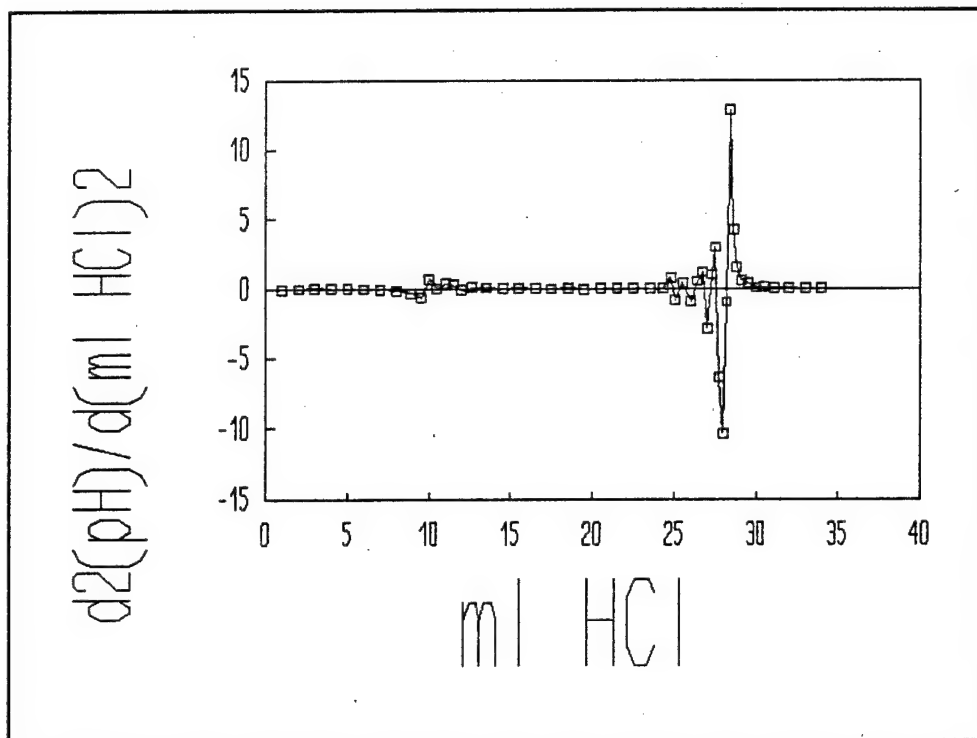


Figure C-126. Second Derivative Of The Fourth Titration Curve For Titration Of Total Spent Sodium Bicarbonate Media With 0.984 M HCl.

TABLE 43. SPENT 1000 MICRON SODIUM BICARBONATE MEDIA - TITRATION 1.

<u>ml 0.984M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	11.512	0.50	0.00	1.00	-0.73
1.0	11.512	1.50	-0.73	2.00	0.49
2.0	10.783	2.50	-0.24	3.00	0.07
3.0	10.546	3.50	-0.16	4.00	0.05
4.0	10.381	4.50	-0.11	5.00	-0.02
5.0	10.267	5.50	-0.14	6.00	0.05
6.0	10.130	6.50	-0.09	7.00	-0.03
7.0	10.040	7.50	-0.12	8.00	0.01
8.0	9.923	8.50	-0.11	9.00	-0.01
9.0	9.811	9.50	-0.12	10.00	0.01
10.0	9.691	10.50	-0.11	11.00	-0.06
11.0	9.585	11.50	-0.16	12.00	0.02
12.0	9.424	12.50	-0.14	13.00	-0.02
13.0	9.285	13.50	-0.16	14.00	-0.11
14.0	9.123	14.50	-0.28	14.88	0.17
15.0	8.846	15.25	-0.15	15.50	-0.57
15.5	8.770	15.75	-0.44	16.00	-0.76
16.0	8.551	16.25	-0.82	16.50	-0.26
16.5	8.141	16.75	-0.95	17.00	0.72
17.0	7.666	17.25	-0.59	17.50	0.43
17.5	7.371	17.75	-0.38	18.13	0.19
18.0	7.183	18.50	-0.24	19.00	0.05
19.0	6.947	19.50	-0.18	20.00	0.04
20.0	6.764	20.50	-0.14	21.00	0.02
21.0	6.624	21.50	-0.12	22.00	0.01
22.0	6.504	22.50	-0.11	23.00	0.01
23.0	6.397	23.50	-0.10	24.00	0.01
24.0	6.299	24.50	-0.08	25.00	-0.01
25.0	6.215	25.50	-0.10	26.00	0.01
26.0	6.119	26.50	-0.09	27.00	-0.01
27.0	6.032	27.50	-0.10	27.78	0.34
28.0	5.935	28.05	0.09	28.10	0.50
28.1	5.944	28.15	0.14	28.20	-0.60
28.2	5.958	28.25	0.08	28.30	-0.10
28.3	5.966	28.35	0.07	28.40	-0.50
28.4	5.973	28.45	0.02	28.50	-0.10
28.5	5.975	28.55	0.01	28.60	0.00
28.6	5.976	28.65	0.01	28.75	-0.43
28.7	5.977	28.85	-0.08	28.98	0.09
29.0	5.954	29.10	-0.05	29.23	-0.37
29.2	5.943	29.35	-0.15	29.50	0.22
29.5	5.899	29.65	-0.08	29.78	-0.10
29.8	5.875	29.90	-0.10	30.08	-0.25
30.0	5.854	30.25	-0.19	30.50	-0.05
30.5	5.758	30.75	-0.22	31.00	-0.22
31.0	5.650	31.25	-0.33	31.45	0.36
31.5	5.487	31.65	-0.18	31.78	0.31

TABLE 43. SPENT 1000 MICRON SODIUM BICARBONATE MEDIA - TITRATION 1
(continued).

<u>ml 0.984M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
31.8	5.432	31.90	-0.10	32.08	-1.38
32.0	5.411	32.25	-0.59	32.45	-0.51
32.5	5.117	32.65	-0.79	32.78	-6.72
32.8	4.880	32.90	-2.47	32.97	-23.60
33.0	4.386	33.05	-6.01	33.10	-1.60
33.1	3.785	33.15	-6.17	33.20	30.70
33.2	3.168	33.25	-3.10	33.30	14.60
33.3	2.858	33.35	-1.64	33.40	3.90
33.4	2.694	33.45	-1.25	33.50	4.80
33.5	2.569	33.55	-0.77	33.60	3.40
33.6	2.492	33.65	-0.43	33.70	-2.20
33.7	2.449	33.75	-0.65	33.80	0.80
33.8	2.384	33.85	-0.57	33.90	0.40
33.9	2.327	33.95	-0.53	34.05	0.72
34.0	2.274	34.15	-0.39	34.28	0.67
34.3	2.158	34.40	-0.22	34.58	-0.13
34.5	2.114	34.75	-0.26	35.00	0.12
35.0	1.982	35.25	-0.20	35.50	0.17
35.5	1.880	35.75	-0.12	36.13	0.01
36.0	1.820	36.50	-0.11	37.00	0.01
37.0	1.711	37.50	-0.09	38.00	0.03
38.0	1.616	38.50	-0.06	39.00	0.00
39.0	1.554	39.50	-0.06	40.00	0.01
40.0	1.493	40.50	-0.05	41.00	0.01
41.0	1.444	41.50	-0.04	31.25	-0.00
42.0	1.404	21.00	0.03	10.50	0.00

NOTE: This sample was taken from the first batch of spent media which was dried in the oven before being broken into size fractions. The spent media dried into a hard cake causing extensive work to break down into particle sizes.

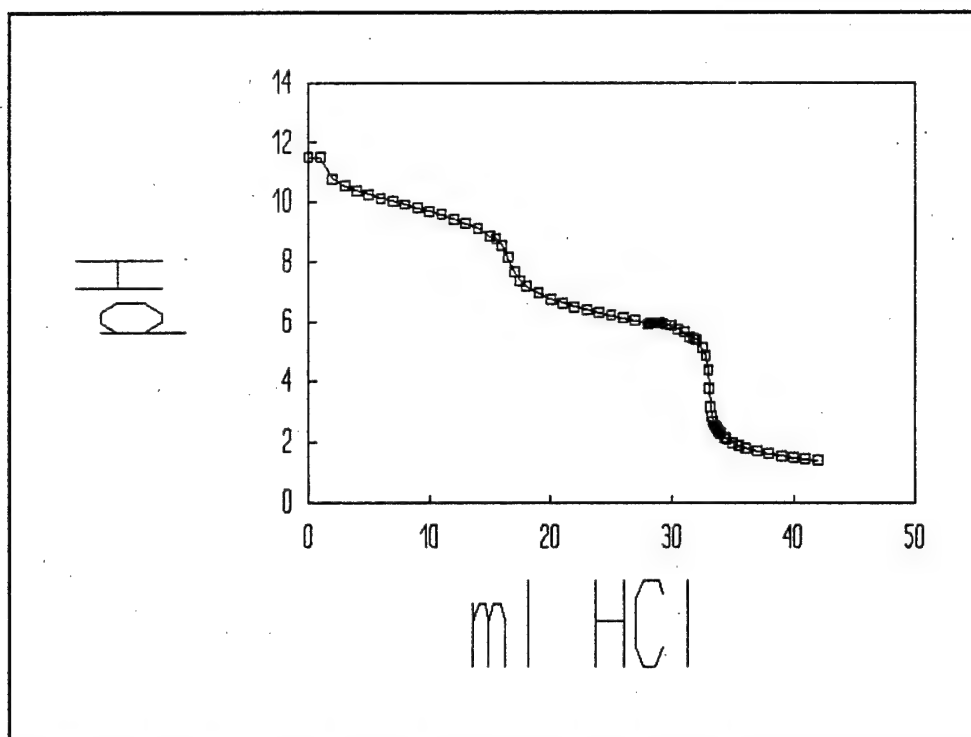


Figure C-127. Curve For The First Titration Of Spent 1000 Micron Sodium Bicarbonate Media With 0.984 M HCl.

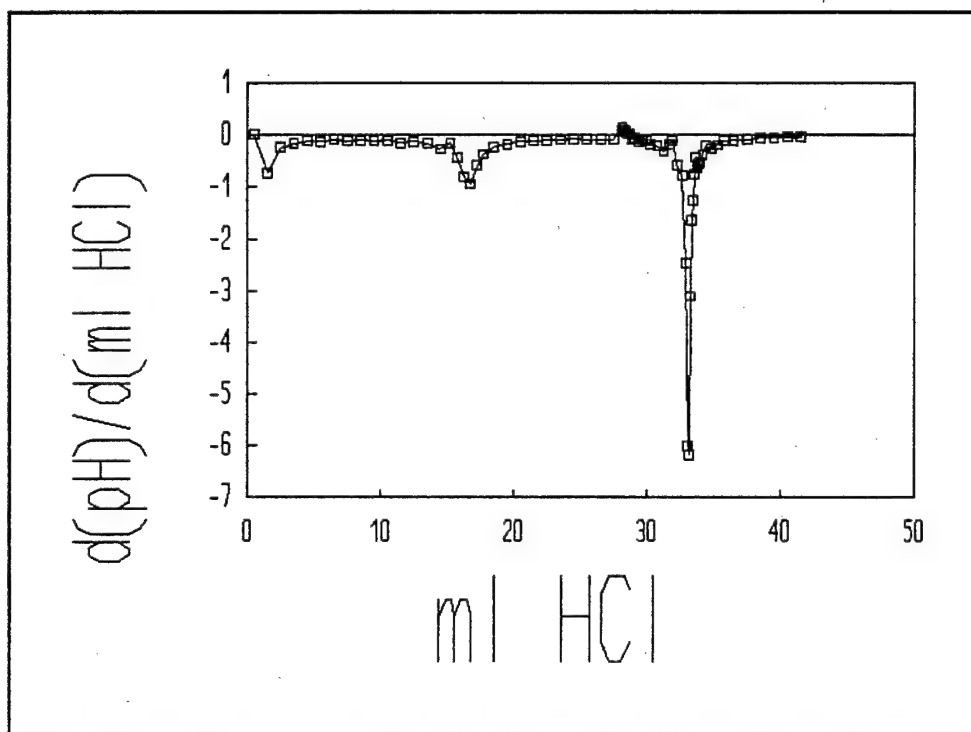


Figure C-128. First Derivative Of The First Titration Curve For Titration Of Spent 1000 Micron Sodium Bicarbonate Media With 0.984 M HCl.

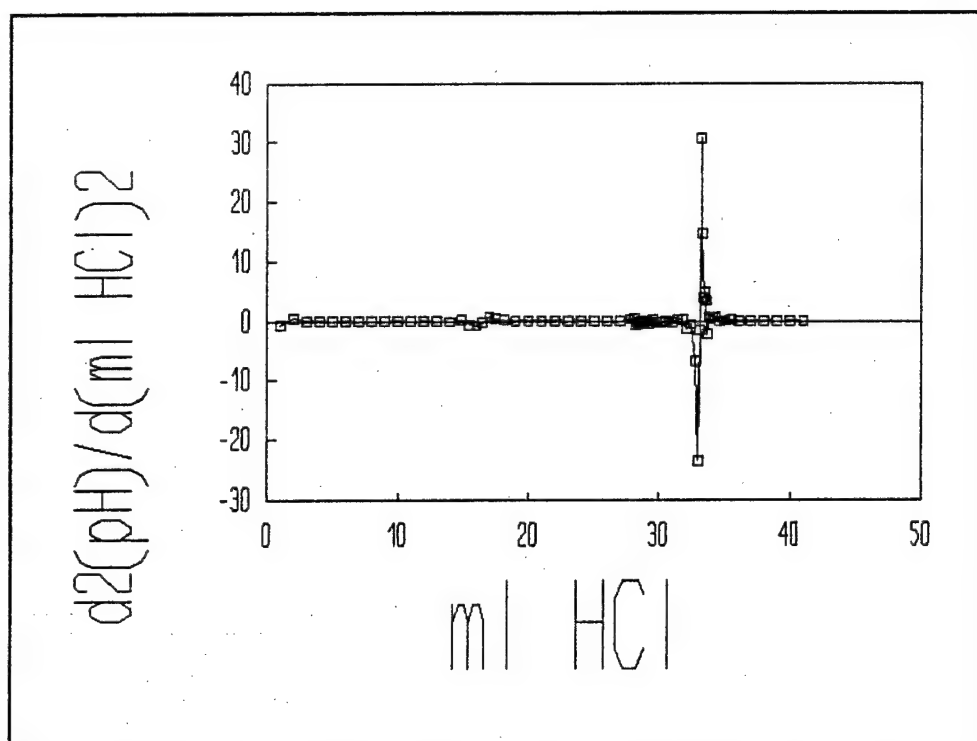


Figure C-129. Second Derivative Of The First Titration Curve For Titration Of Spent 1000 Micron Sodium Bicarbonate Media With 0.984 M HCl.

TABLE 44. SPENT 1000 MICRON SODIUM BICARBONATE MEDIA - TITRATION 2.

<u>ml 0.984M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	9.466	0.50	-0.31	1.00	0.06
1.0	9.157	1.50	-0.25	2.00	0.01
2.0	8.911	2.50	-0.24	2.88	-0.24
3.0	8.671	3.25	-0.42	3.50	-0.14
3.5	8.460	3.75	-0.49	4.00	-0.62
4.0	8.214	4.25	-0.80	4.50	0.44
4.5	7.813	4.75	-0.58	5.00	0.67
5.0	7.523	5.25	-0.24	5.50	-0.04
5.5	7.401	5.75	-0.26	6.00	0.05
6.0	7.269	6.25	-0.24	6.50	0.28
6.5	7.149	6.75	-0.10	7.00	-0.14
7.0	7.099	7.25	-0.17	7.63	0.02
7.5	7.015	8.00	-0.15	8.50	0.04
8.5	6.863	9.00	-0.11	9.50	0.03
9.5	6.750	10.00	-0.09	10.50	0.01
10.5	6.663	11.00	-0.08	11.50	0.01
11.5	6.585	12.00	-0.07	12.50	-0.00
12.5	6.514	13.00	-0.07	13.50	0.01
13.5	6.440	14.00	-0.06	14.50	0.00
14.5	6.379	15.00	-0.06	15.50	0.00
15.5	6.318	16.00	-0.06	16.50	0.01
16.5	6.258	17.00	-0.05	17.50	-0.06
17.5	6.207	18.00	-0.11	18.50	0.04
18.5	6.097	19.00	-0.07	19.50	-0.00
19.5	6.025	20.00	-0.07	20.38	0.05
20.5	5.953	20.75	-0.03	21.00	-0.19
21.0	5.936	21.25	-0.13	21.43	0.09
21.5	5.871	21.60	-0.10	21.73	0.40
21.7	5.851	21.85	0.00	22.05	-0.36
22.0	5.851	22.25	-0.15	22.50	-0.10
22.5	5.778	22.75	-0.20	23.00	-0.17
23.0	5.680	23.25	-0.28	23.50	-0.17
23.5	5.540	23.75	-0.36	24.00	-0.31
24.0	5.358	24.25	-0.52	24.43	-2.45
24.5	5.099	24.60	-1.37	24.73	-4.34
24.7	4.824	24.85	-2.46	24.95	-27.25
25.0	4.086	25.05	-7.91	25.10	41.50
25.1	3.295	25.15	-3.76	25.20	17.70
25.2	2.919	25.25	-1.99	25.30	10.30
25.3	2.720	25.35	-0.96	25.40	-0.60
25.4	2.624	25.45	-1.02	25.50	1.70
25.5	2.522	25.55	-0.85	25.60	2.30
25.6	2.437	25.65	-0.62	25.70	1.60
25.7	2.375	25.75	-0.46	25.83	2.03
25.8	2.329	25.90	-0.15	26.08	-0.68
26.0	2.298	26.25	-0.39	26.50	0.39
26.5	2.101	26.75	-0.20	27.00	0.02

TABLE 44. SPENT 1000 MICRON SODIUM BICARBONATE MEDIA - TITRATION 2
(continued).

<u>ml 0.984M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d²(pH)/d(ml)²</u>
27.0	2.002	27.25	-0.19	27.50	0.05
27.5	1.907	27.75	-0.16	28.13	0.08
28.0	1.825	28.50	-0.10	29.00	0.00
29.0	1.723	29.50	-0.10	30.00	0.04
30.0	1.622	30.50	-0.06	31.00	0.01
31.0	1.559	31.50	-0.06	32.00	0.01
32.0	1.504	32.50	-0.05	33.00	0.00
33.0	1.457	33.50	-0.05	34.00	0.00
34.0	1.410	34.50	-0.04	26.00	-0.00
35.0	1.367	17.50	0.04	8.75	0.00

NOTE: This sample was taken from the second batch of spent media which was broken into size fractions as it dried. This approach greatly reduced the time required to break down the media into particle sizes.

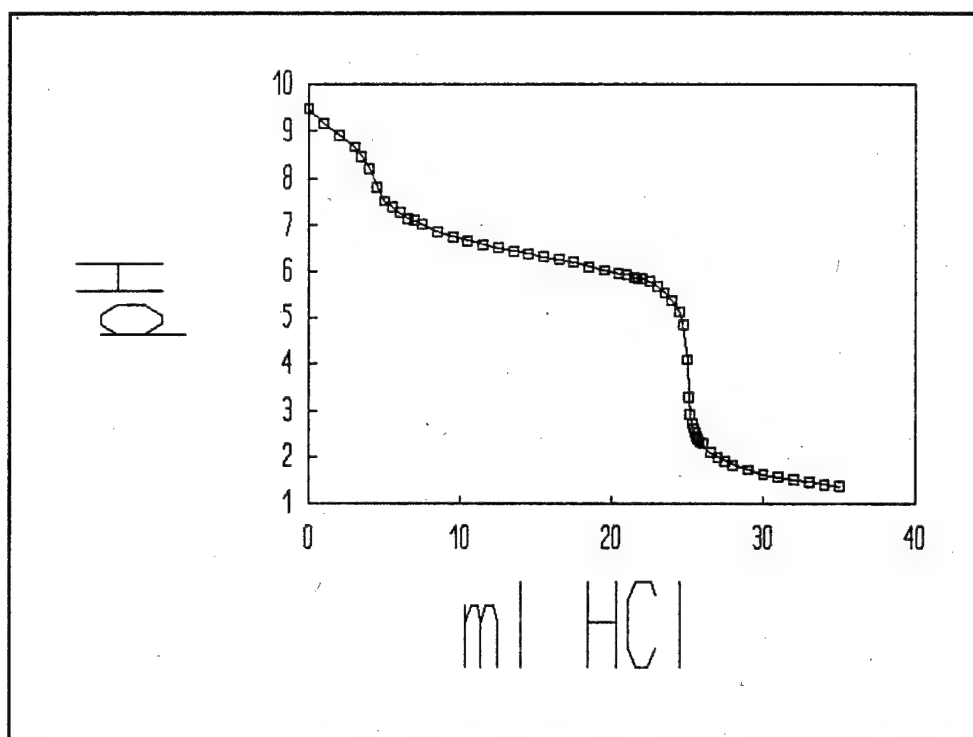


Figure C-130. Curve For The Second Titration Of Spent 1000 Micron Sodium Bicarbonate Media With 0.984 M HCl.

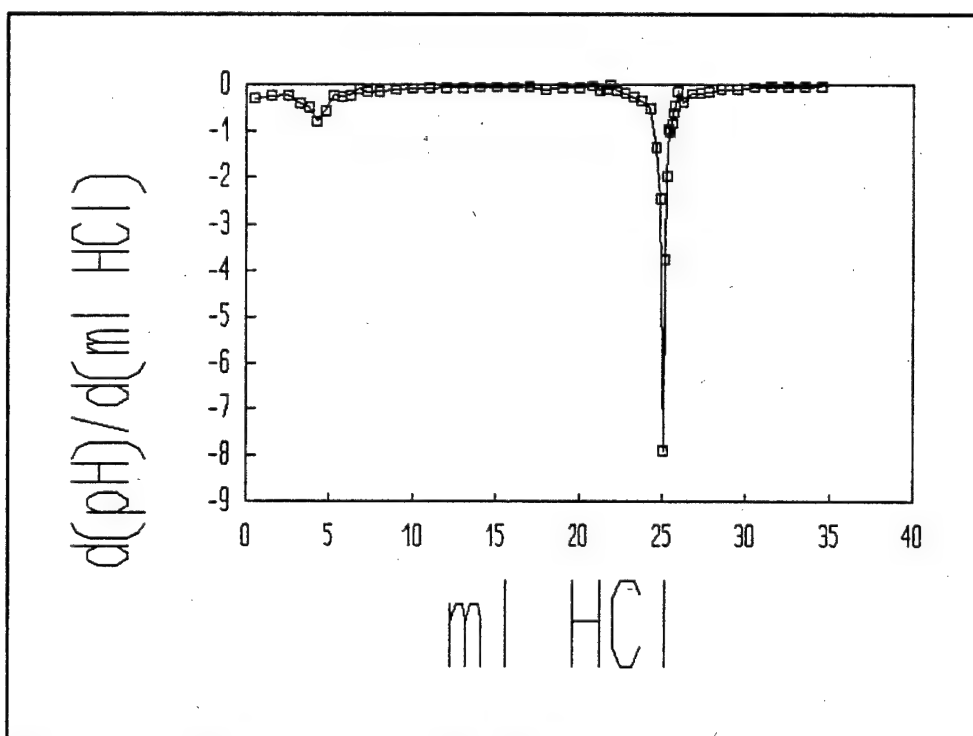


Figure C-131. First Derivative Of The Second Titration Curve For Titration Of Spent 1000 Micron Sodium Bicarbonate Media With 0.984 M HCl.

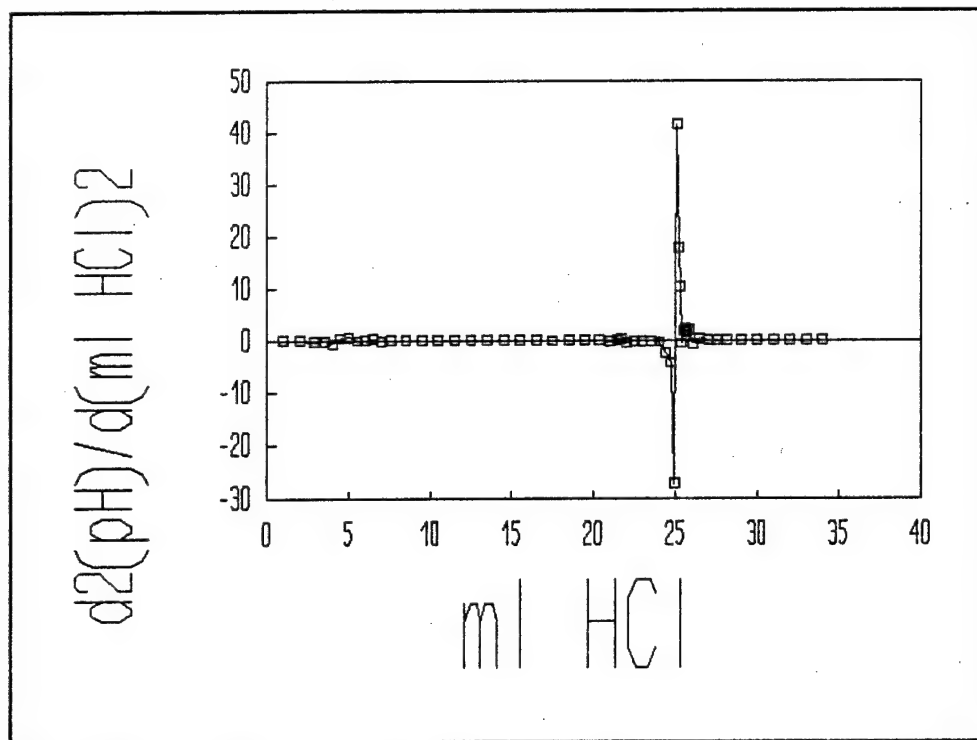


Figure C-132. Second Derivative Of The Second Titration Curve For Titration Of Spent 1000 Micron Sodium Bicarbonate Media With 0.984 M HCl .

TABLE 45. SPENT 1000 MICRON SODIUM BICARBONATE MEDIA - TITRATION 3.

ml 0.984M HCl	pH	Vol (ml)	d(pH)/d(ml)	Vol (ml)	d ² (pH)/d(ml) ²
0.0	9.432	0.50	-0.19	1.00	-0.04
1.0	9.243	1.50	-0.23	2.00	-0.07
2.0	9.015	2.50	-0.30	2.88	-0.29
3.0	8.720	3.25	-0.52	3.50	-0.10
3.5	8.462	3.75	-0.56	4.00	0.01
4.0	8.180	4.25	-0.56	4.50	-0.26
4.5	7.901	4.75	-0.69	5.00	0.86
5.0	7.556	5.25	-0.26	5.50	-0.22
5.5	7.427	5.75	-0.37	6.00	0.34
6.0	7.242	6.25	-0.20	6.50	0.06
6.5	7.142	6.75	-0.17	7.00	0.21
7.0	7.056	7.25	-0.07	7.50	-0.18
7.5	7.022	7.75	-0.16	8.13	0.06
8.0	6.942	8.50	-0.11	9.00	0.00
9.0	6.829	9.50	-0.11	10.00	0.03
10.0	6.716	10.50	-0.09	11.00	0.00
11.0	6.629	11.50	-0.09	12.00	0.02
12.0	6.544	12.50	-0.06	13.00	-0.00
13.0	6.480	13.50	-0.07	14.00	0.01
14.0	6.413	14.50	-0.06	15.00	0.01
15.0	6.353	15.50	-0.05	16.00	-0.04
16.0	6.306	16.50	-0.08	17.00	0.01
17.0	6.223	17.50	-0.07	18.00	0.00
18.0	6.152	18.50	-0.07	19.00	-0.02
19.0	6.084	19.50	-0.09	20.00	0.00
20.0	5.994	20.50	-0.09	20.80	0.16
21.0	5.905	21.10	0.01	21.23	-0.11
21.2	5.907	21.35	-0.02	21.50	-0.30
21.5	5.902	21.65	-0.11	21.78	0.05
21.8	5.870	21.90	-0.09	22.08	-0.31
22.0	5.851	22.25	-0.20	22.43	0.56
22.5	5.750	22.60	-0.01	22.73	-0.70
22.7	5.749	22.85	-0.18	23.05	-0.21
23.0	5.695	23.25	-0.26	23.50	-0.05
23.5	5.563	23.75	-0.29	24.00	-0.84
24.0	5.419	24.25	-0.71	24.50	-1.34
24.5	5.066	24.75	-1.38	24.93	-13.88
25.0	4.377	25.10	-6.23	25.18	22.17
25.2	3.130	25.25	-2.91	25.30	12.20
25.3	2.839	25.35	-1.69	25.40	4.10
25.4	2.670	25.45	-1.28	25.55	2.75
25.5	2.542	25.65	-0.73	25.78	1.18
25.8	2.323	25.90	-0.43	26.08	0.26
26.0	2.236	26.25	-0.34	26.50	0.24
26.5	2.064	26.75	-0.23	27.00	0.17
27.0	1.951	27.25	-0.14	27.50	-0.02
27.5	1.881	27.75	-0.15	28.13	0.07

TABLE 45. SPENT 1000 MICRON SODIUM BICARBONATE MEDIA - TITRATION 3
(continued).

<u>ml 0.984M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d²(pH)/d(ml)²</u>
28.0	1.807	28.50	-0.09	29.00	0.01
29.0	1.714	29.50	-0.08	30.00	0.02
30.0	1.632	30.50	-0.06	31.00	0.00
31.0	1.572	31.50	-0.06	32.00	0.01
32.0	1.515	32.50	-0.05	33.00	0.00
33.0	1.465	33.50	-0.05	34.00	-0.00
34.0	1.420	34.50	-0.05	26.00	-0.01
35.0	1.373	17.50	0.04	8.75	0.00

NOTE: This sample was taken from the second batch of spent media which was broken into size fractions as it dried. This approach greatly reduced the time required to break down the media into particle sizes.

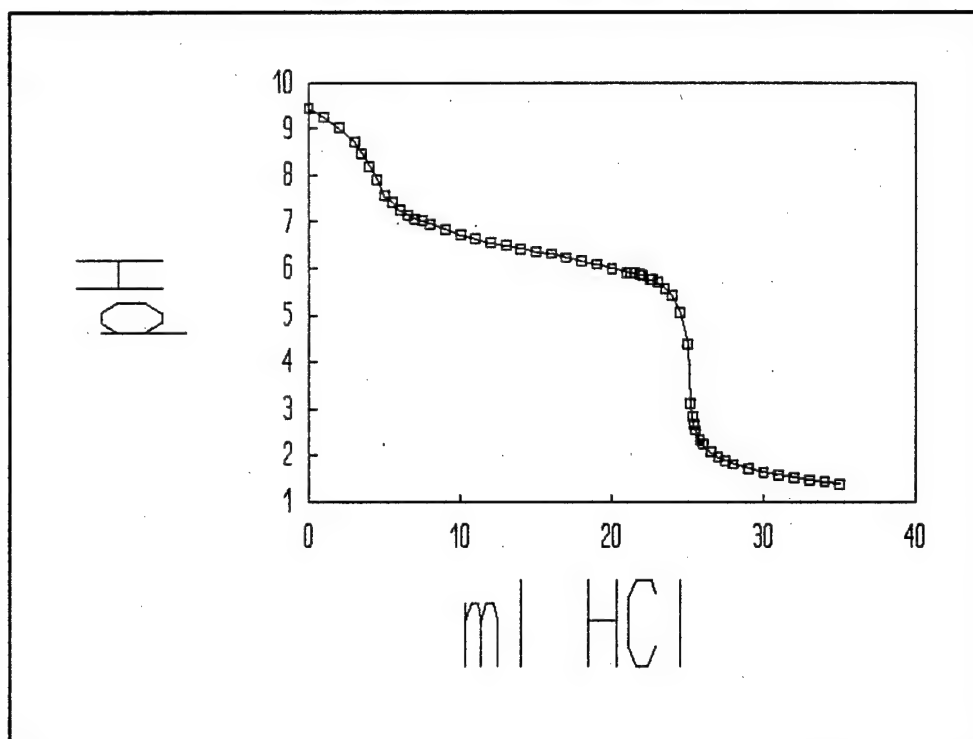


Figure C-133. Curve For The Third Titration Of Spent 1000 Micron Sodium Bicarbonate Media With 0.984 M HCl.

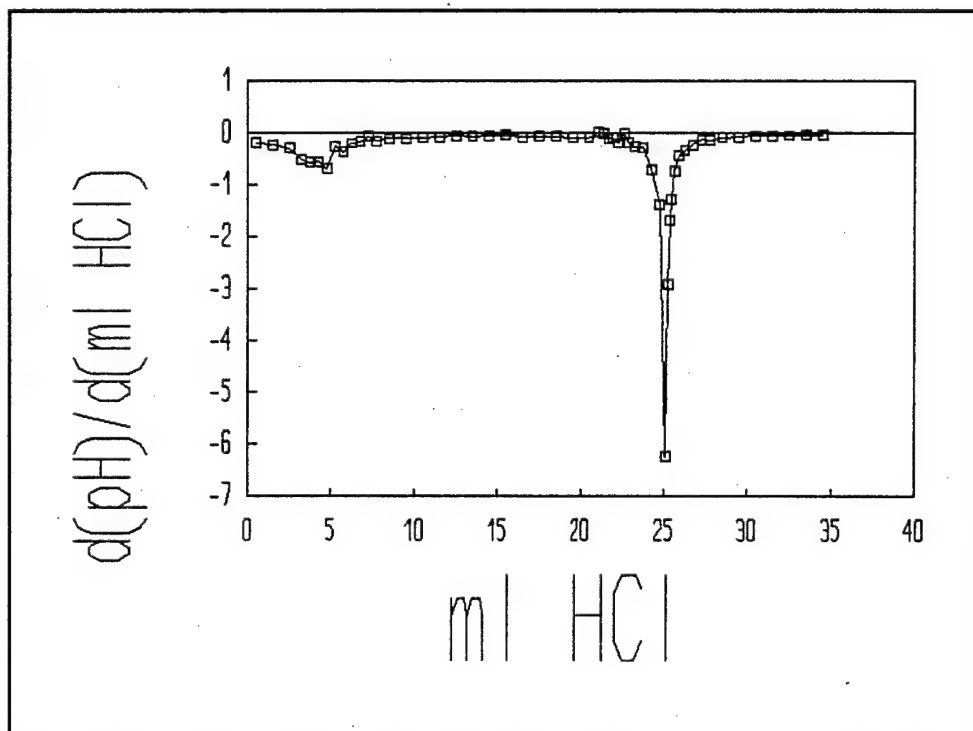


Figure C-134. First Derivative Of The Third Titration Curve For Titration Of Spent 1000 Micron Sodium Bicarbonate Media With 0.984 M HCl.

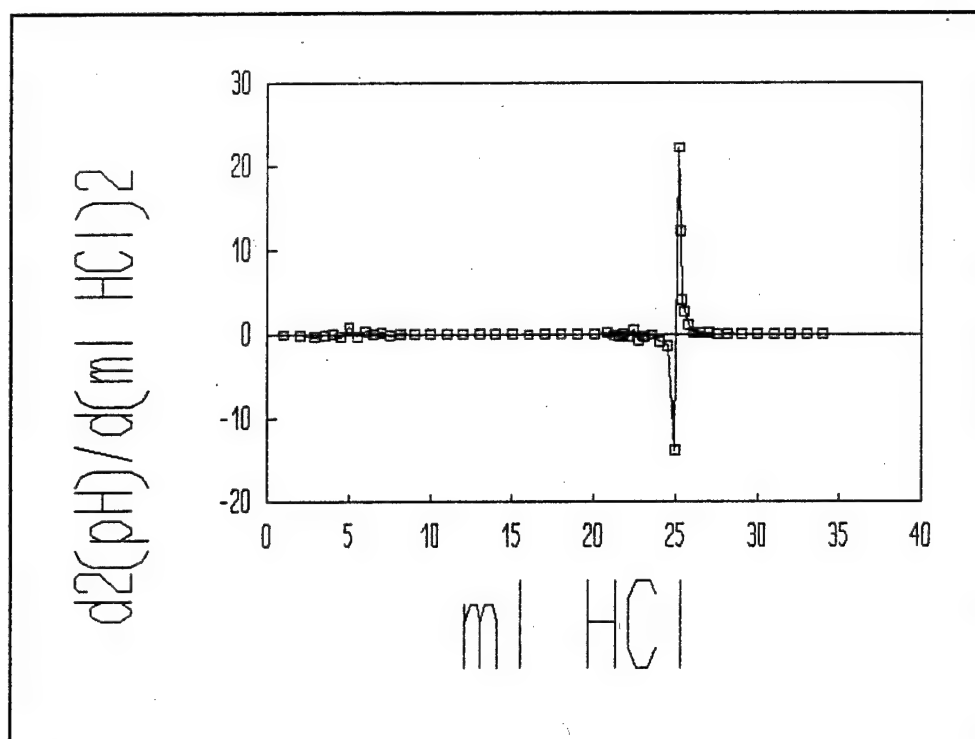


Figure C-135. Second Derivative Of The Third Titration Curve For Titration Of Spent 1000 Micron Sodium Bicarbonate Media With 0.984 M HCl.

TABLE 46. SPENT 1000 MICRON SODIUM BICARBONATE MEDIA - TITRATION 4.

<u>ml 0.984M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d²(pH)/d(ml)²</u>
0.0	9.529	0.50	-0.24	1.00	0.05
1.0	9.293	1.50	-0.19	2.00	-0.06
2.0	9.103	2.50	-0.25	2.88	0.03
3.0	8.852	3.25	-0.23	3.50	-0.34
3.5	8.739	3.75	-0.40	4.00	-0.24
4.0	8.540	4.25	-0.52	4.50	-0.22
4.5	8.281	4.75	-0.63	5.00	0.26
5.0	7.968	5.25	-0.50	5.50	0.23
5.5	7.720	5.75	-0.38	6.00	0.32
6.0	7.529	6.25	-0.22	6.50	-0.13
6.5	7.417	6.75	-0.29	7.00	0.22
7.0	7.273	7.25	-0.18	7.50	0.05
7.5	7.183	7.75	-0.16	8.13	0.02
8.0	7.105	8.50	-0.14	9.00	0.02
9.0	6.961	9.50	-0.12	10.00	0.04
10.0	6.841	10.50	-0.08	11.00	-0.01
11.0	6.759	11.50	-0.09	12.00	0.01
12.0	6.667	12.50	-0.08	13.00	0.02
13.0	6.587	13.50	-0.06	14.00	0.00
14.0	6.525	14.50	-0.06	15.00	0.03
15.0	6.466	15.50	-0.03	16.00	-0.05
16.0	6.437	16.50	-0.08	17.00	0.03
17.0	6.361	17.50	-0.05	18.00	-0.05
18.0	6.311	18.50	-0.10	19.00	0.01
19.0	6.215	19.50	-0.08	20.00	0.00
20.0	6.134	20.50	-0.08	21.00	-0.04
21.0	6.057	21.50	-0.12	22.00	-0.03
22.0	5.936	22.50	-0.16	22.88	0.03
23.0	5.780	23.25	-0.13	23.50	-0.37
23.5	5.713	23.75	-0.32	23.93	0.27
24.0	5.554	24.10	-0.22	24.20	-0.70
24.2	5.509	24.30	-0.37	24.40	1.48
24.4	5.436	24.50	-0.07	24.60	-2.73
24.6	5.422	24.70	-0.62	24.80	0.80
24.8	5.299	24.90	-0.45	25.03	-2.65
25.0	5.208	25.15	-1.12	25.28	-5.79
25.3	4.873	25.40	-2.56	25.50	-15.60
25.5	4.360	25.60	-5.68	25.68	15.70
25.7	3.223	25.75	-3.33	25.80	23.30
25.8	2.890	25.85	-1.00	25.90	-11.00
25.9	2.790	25.95	-2.10	26.00	15.10
26.0	2.580	26.05	-0.59	26.13	-1.10
26.1	2.521	26.20	-0.76	26.30	1.10
26.3	2.370	26.40	-0.53	26.58	0.48
26.5	2.263	26.75	-0.37	27.00	0.26
27.0	2.079	27.25	-0.24	27.50	0.16
27.5	1.960	27.75	-0.16	28.13	0.04

TABLE 46. SPENT 1000 MICRON SODIUM BICARBONATE MEDIA - TITRATION 4
(continued).

<u>ml 0.984M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d²(pH)/d(ml)²</u>
28.0	1.880	28.50	-0.13	29.00	0.04
29.0	1.752	29.50	-0.09	30.00	0.02
30.0	1.662	30.50	-0.07	31.00	0.01
31.0	1.588	31.50	-0.06	32.00	0.01
32.0	1.526	32.50	-0.05	33.00	0.00
33.0	1.479	33.50	-0.04	34.00	0.00
34.0	1.435	34.50	-0.04	26.00	-0.00
35.0	1.391	17.50	0.04	8.75	0.00

NOTE: This sample was taken from the second batch of spent media which was broken into size fractions as it dried. This approach greatly reduced the time required to break down the media into particle sizes.

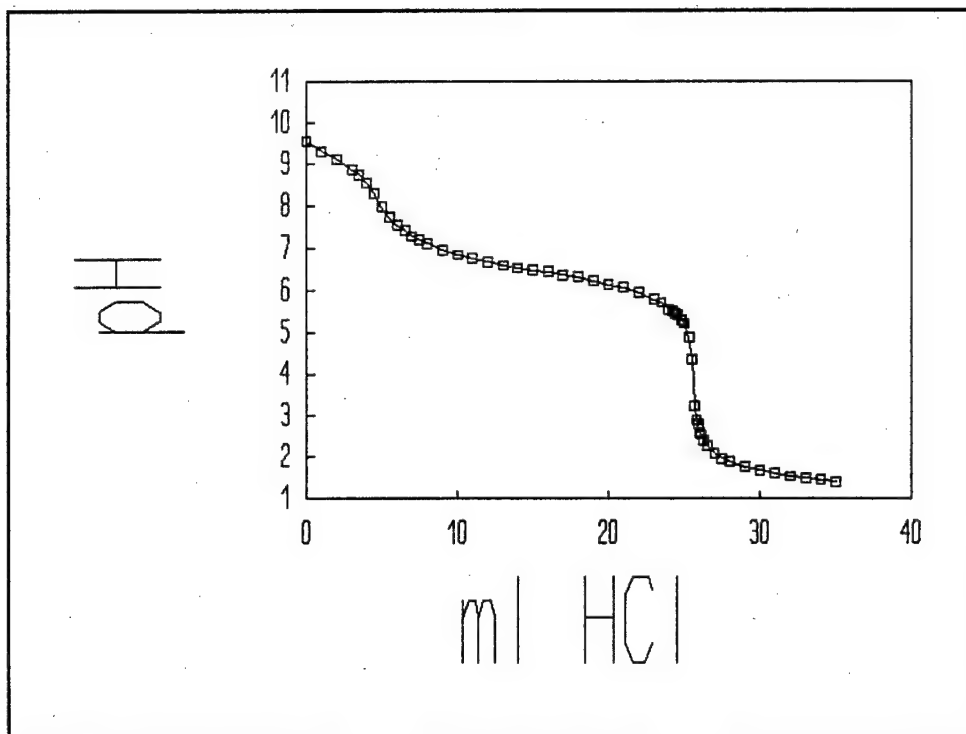


Figure C-136. Curve For The Fourth Titration Of Spent 1000 Micron Sodium Bicarbonate Media With 0.984 M HCl.

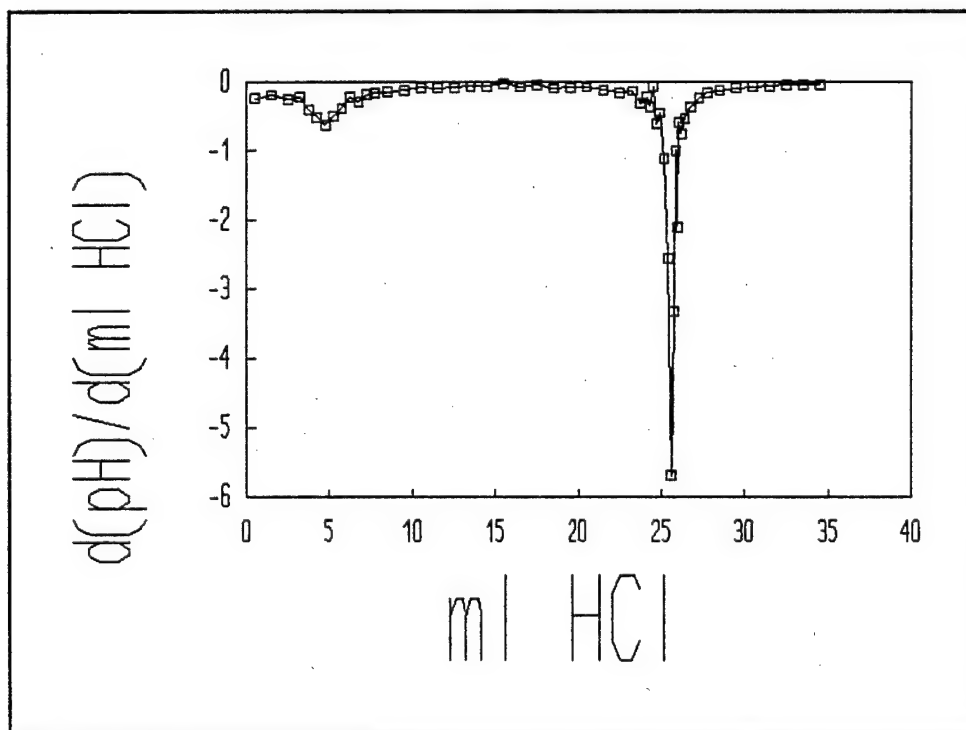


Figure C-137. First Derivative Of The Fourth Titration Curve For Titration Of Spent 1000 Micron Sodium Bicarbonate Media With 0.984 M HCl.

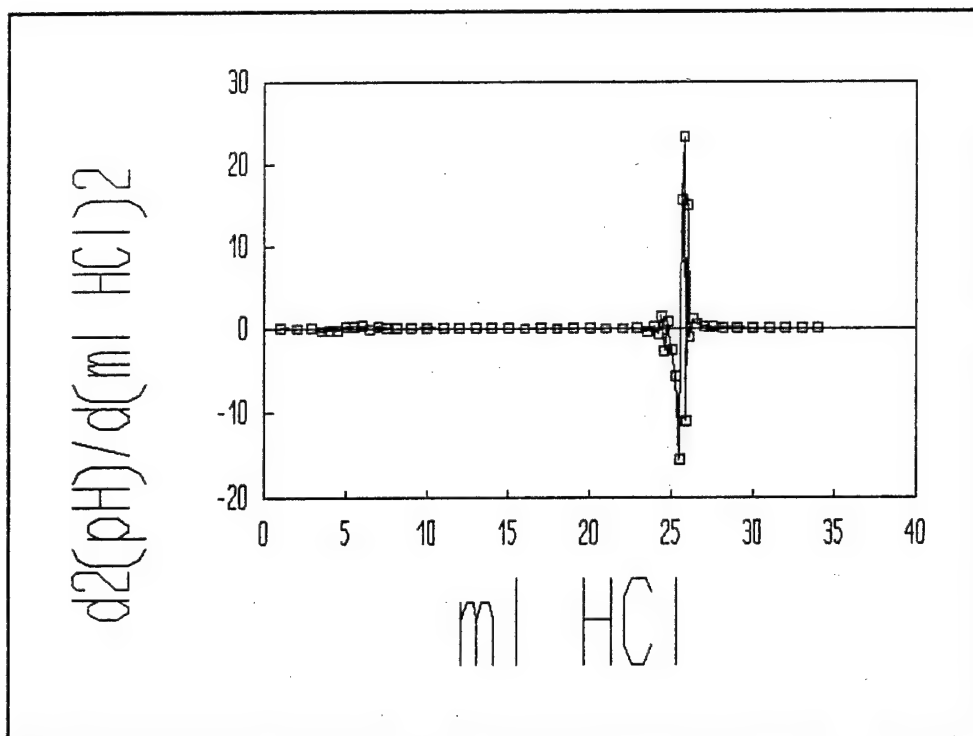


Figure C-138. Second Derivative Of The Fourth Titration Curve For Titration Of Spent 1000 Micron Sodium Bicarbonate Media With 0.984 M HCl.

TABLE 47. SPENT 600 MICRON SODIUM BICARBONATE MEDIA - TITRATION 1.

<u>ml 0.984M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	11.353	0.50	-0.32	1.00	0.06
1.0	11.038	1.50	-0.26	2.00	0.04
2.0	10.782	2.50	-0.22	3.00	0.09
3.0	10.565	3.50	-0.13	4.00	-0.03
4.0	10.435	4.50	-0.16	5.00	0.05
5.0	10.276	5.50	-0.11	6.00	-0.00
6.0	10.164	6.50	-0.11	7.00	0.01
7.0	10.051	7.50	-0.11	8.00	0.00
8.0	9.945	8.50	-0.11	9.00	0.01
9.0	9.839	9.50	-0.10	10.00	-0.00
10.0	9.742	10.50	-0.10	11.00	-0.07
11.0	9.642	11.50	-0.17	12.00	0.07
12.0	9.468	12.50	-0.10	13.00	-0.07
13.0	9.369	13.50	-0.17	14.00	-0.02
14.0	9.196	14.50	-0.20	15.00	-0.03
15.0	8.998	15.50	-0.23	15.88	-0.46
16.0	8.767	16.25	-0.57	16.50	0.62
16.5	8.480	16.75	-0.26	17.13	-0.78
17.0	8.348	17.50	-0.85	17.88	0.55
18.0	7.502	18.25	-0.44	18.50	-0.15
18.5	7.284	18.75	-0.51	19.13	0.57
19.0	7.029	19.50	-0.08	20.00	-0.10
20.0	6.945	20.50	-0.18	21.00	0.04
21.0	6.765	21.50	-0.14	22.00	0.03
22.0	6.627	22.50	-0.11	23.00	-0.00
23.0	6.518	23.50	-0.11	24.00	0.03
24.0	6.406	24.50	-0.08	25.00	-0.01
25.0	6.324	25.50	-0.09	26.00	0.03
26.0	6.229	26.50	-0.07	27.00	-0.02
27.0	6.161	27.50	-0.09	28.00	0.01
28.0	6.072	28.50	-0.08	28.83	0.16
29.0	5.996	29.15	0.03	29.30	0.17
29.3	6.004	29.45	0.08	29.63	-0.51
29.6	6.027	29.80	-0.10	29.97	0.16
30.0	5.986	30.15	-0.05	30.30	-0.17
30.3	5.972	30.45	-0.10	30.63	-0.02
30.6	5.943	30.80	-0.10	30.97	0.16
31.0	5.902	31.15	-0.05	31.30	-0.23
31.3	5.888	31.45	-0.12	31.63	-0.11
31.6	5.853	31.80	-0.16	32.03	-0.03
32.0	5.791	32.25	-0.17	32.50	-0.03
32.5	5.706	32.75	-0.19	32.95	-0.05
33.0	5.613	33.15	-0.21	33.30	-0.29
33.3	5.551	33.45	-0.29	33.63	-0.26
33.6	5.463	33.80	-0.38	33.97	0.20
34.0	5.309	34.15	-0.32	34.30	-1.54
34.3	5.214	34.45	-0.78	34.57	-1.92

TABLE 47. SPENT 600 MICRON SODIUM BICARBONATE MEDIA - TITRATION 1
(continued).

<u>ml 0.984M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d²(pH)/d(ml)²</u>
34.6	4.980	34.70	-1.26	34.80	-7.62
34.8	4.728	34.90	-2.78	35.00	-16.33
35.0	4.171	35.10	-6.05	35.20	21.65
35.2	2.961	35.30	-1.72	35.40	3.70
35.4	2.617	35.50	-0.98	35.60	0.80
35.6	2.421	35.70	-0.82	35.80	2.95
35.8	2.257	35.90	-0.23	36.20	-0.08
36.0	2.211	36.50	-0.28	37.00	0.14
37.0	1.931	37.50	-0.14	38.00	0.04
38.0	1.788	38.50	-0.10	39.00	0.02
39.0	1.686	39.50	-0.08	29.75	-0.01
40.0	1.608	20.00	0.04	10.00	0.00

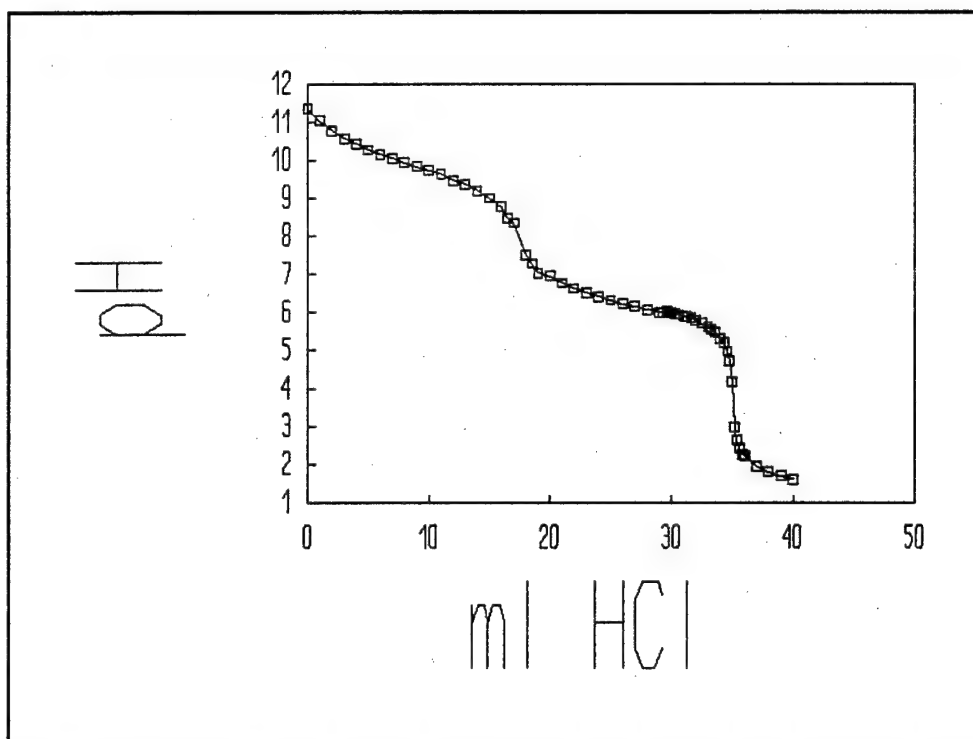


Figure C-139. Curve For The First Titration Of Spent 600 Micron Sodium Bicarbonate Media With 0.984 M HCl.

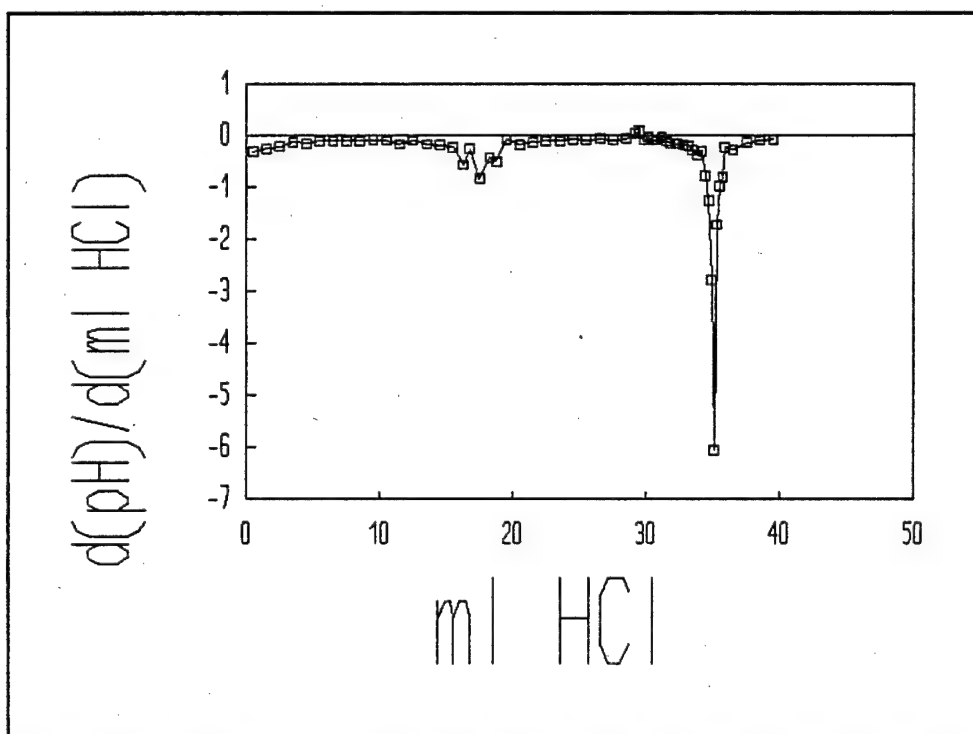


Figure C-140. First Derivative Of The First Titration Curve For Titration Of Spent 600 Micron Sodium Bicarbonate Media With 0.984 M HCl.

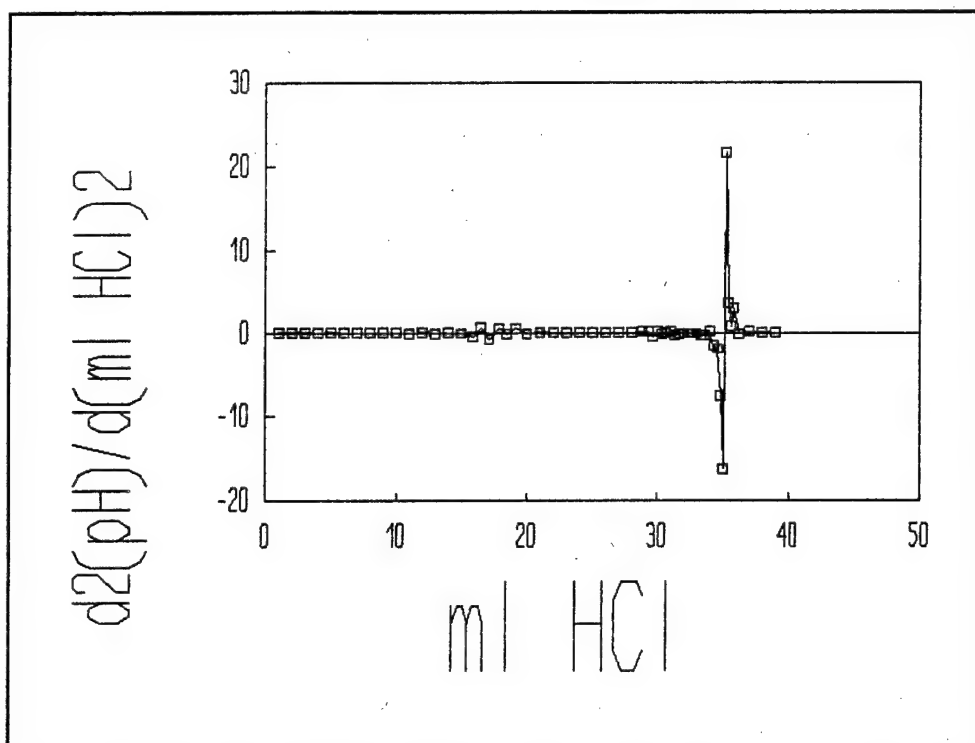


Figure C-141. Second Derivative Of The First Titration Curve For Titration Of Spent 600 Micron Sodium Bicarbonate Media With 0.984 M HCl.

TABLE 48. SPENT 600 MICRON SODIUM BICARBONATE MEDIA - TITRATION 2.

<u>ml 0.984M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	11.337	0.50	-0.28	1.00	0.01
1.0	11.054	1.50	-0.27	2.00	0.11
2.0	10.784	2.50	-0.16	3.00	0.03
3.0	10.620	3.50	-0.14	4.00	0.01
4.0	10.485	4.50	-0.12	5.00	-0.02
5.0	10.362	5.50	-0.14	6.00	0.04
6.0	10.221	6.50	-0.10	7.00	-0.00
7.0	10.122	7.50	-0.10	8.00	-0.01
8.0	10.020	8.50	-0.11	9.00	-0.01
9.0	9.910	9.50	-0.12	10.00	0.02
10.0	9.792	10.50	-0.10	11.00	-0.03
11.0	9.694	11.50	-0.13	12.00	0.01
12.0	9.564	12.50	-0.12	13.00	-0.05
13.0	9.441	13.50	-0.17	14.00	-0.00
14.0	9.268	14.50	-0.17	15.00	-0.14
15.0	9.094	15.50	-0.31	15.88	-0.09
16.0	8.782	16.25	-0.38	16.50	-0.50
16.5	8.592	16.75	-0.63	17.00	-0.54
17.0	8.277	17.25	-0.90	17.50	0.58
17.5	7.826	17.75	-0.61	18.00	0.36
18.0	7.521	18.25	-0.43	18.50	0.28
18.5	7.305	18.75	-0.29	19.00	0.12
19.0	7.159	19.25	-0.23	19.63	0.06
19.5	7.042	20.00	-0.19	20.50	0.04
20.5	6.851	21.00	-0.15	21.50	0.03
21.5	6.699	22.00	-0.12	22.50	0.01
22.5	6.580	23.00	-0.11	23.50	0.03
23.5	6.473	24.00	-0.08	24.50	0.00
24.5	6.397	25.00	-0.07	25.50	-0.02
25.5	6.324	26.00	-0.09	26.50	0.15
26.5	6.235	27.00	0.06	27.50	-0.16
27.5	6.295	28.00	-0.11	28.50	-0.01
28.5	6.190	29.00	-0.12	29.38	0.01
29.5	6.073	29.75	-0.11	30.13	-0.01
30.0	6.019	30.50	-0.12	31.00	-0.04
31.0	5.903	31.50	-0.16	31.88	0.07
32.0	5.743	32.25	-0.11	32.50	-0.15
32.5	5.690	32.75	-0.18	33.00	-0.04
33.0	5.599	33.25	-0.20	33.50	-0.18
33.5	5.497	33.75	-0.29	34.00	-0.50
34.0	5.350	34.25	-0.55	34.50	-3.27
34.5	5.077	34.75	-2.18	34.95	-5.48
35.0	3.986	35.15	-4.37	35.28	13.15
35.3	2.674	35.40	-1.08	35.53	2.18
35.5	2.457	35.65	-0.54	35.78	0.30
35.8	2.295	35.90	-0.46	36.20	0.28
36.0	2.202	36.50	-0.29	37.00	0.14

TABLE 48. SPENT 600 MICRON SODIUM BICARBONATE MEDIA - TITRATION 2
(continued).

<u>ml 0.984M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d²(pH)/d(ml)²</u>
37.0	1.908	37.50	-0.15	38.00	0.03
38.0	1.755	38.50	-0.12	39.00	0.06
39.0	1.634	39.50	-0.06	29.75	-0.01
40.0	1.574	20.00	0.04	10.00	0.00

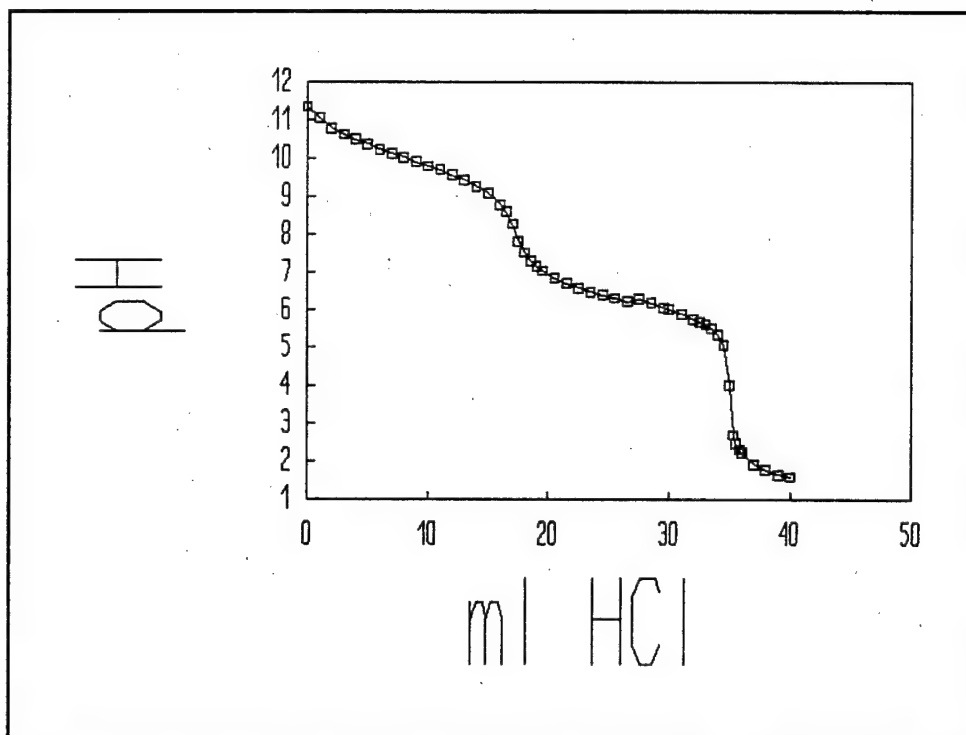


Figure C-142. Curve For The Second Titration Of Spent 600 Micron Sodium Bicarbonate Media With 0.984 M HCl.

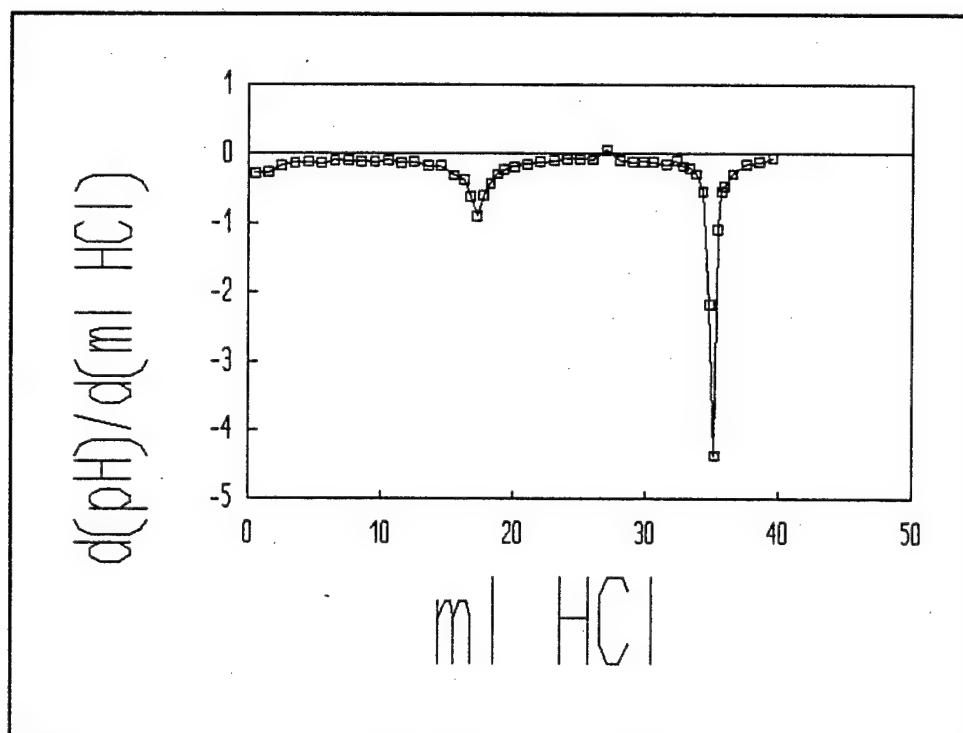


Figure C-143. First Derivative Of The Second Titration Curve For Titration Of Spent 600 Micron Sodium Bicarbonate Media With 0.984 M HCl.

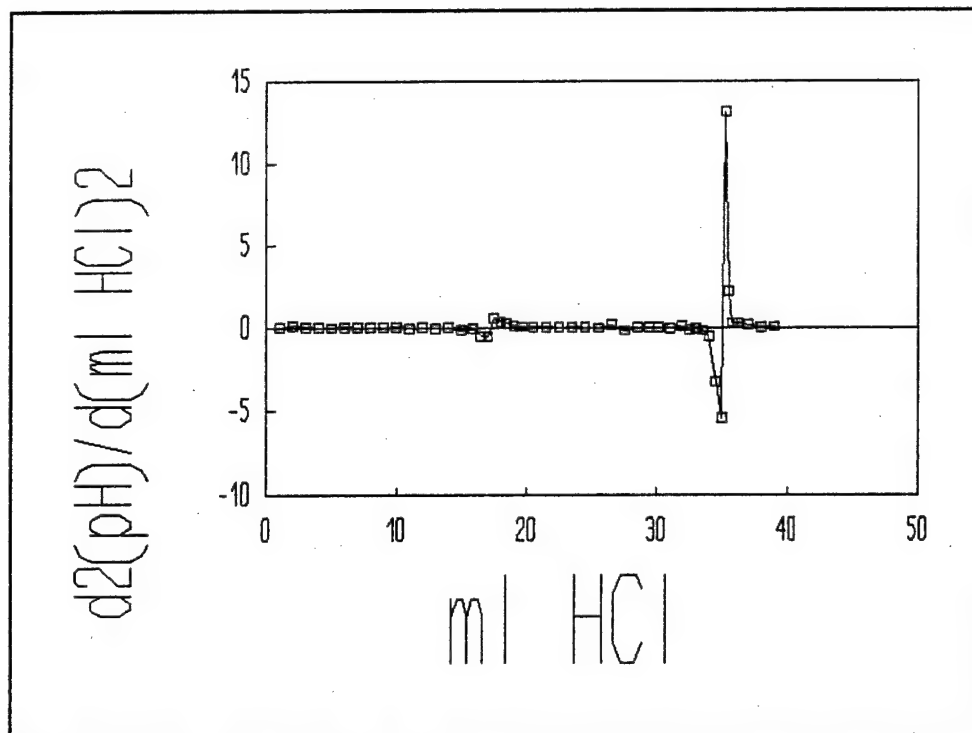


Figure C-144. Second Derivative Of The Second Titration Curve For Titration Of Spent 600 Micron Sodium Bicarbonate Media With 0.984 M HCl.

TABLE 49. SPENT 600 MICRON SODIUM BICARBONATE MEDIA - TITRATION 3.

<u>ml 0.984M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	11.607	0.50	-0.56	1.00	0.29
1.0	11.049	1.50	-0.27	2.00	0.12
2.0	10.778	2.50	-0.15	3.00	0.01
3.0	10.628	3.50	-0.14	4.00	-0.00
4.0	10.486	4.50	-0.14	5.00	0.03
5.0	10.342	5.50	-0.11	6.00	0.00
6.0	10.228	6.50	-0.11	7.00	-0.00
7.0	10.115	7.50	-0.12	8.00	0.02
8.0	9.998	8.50	-0.09	9.00	-0.01
9.0	9.906	9.50	-0.11	10.00	-0.01
10.0	9.799	10.50	-0.11	11.00	-0.00
11.0	9.686	11.50	-0.12	12.00	-0.02
12.0	9.570	12.50	-0.13	13.00	-0.02
13.0	9.435	13.50	-0.15	14.00	-0.03
14.0	9.285	14.50	-0.18	15.00	-0.09
15.0	9.109	15.50	-0.26	15.88	-0.16
16.0	8.845	16.25	-0.38	16.50	-0.44
16.5	8.653	16.75	-0.60	17.00	-0.44
17.0	8.352	17.25	-0.82	17.50	0.08
17.5	7.940	17.75	-0.79	18.00	0.80
18.0	7.547	18.25	-0.39	18.50	0.10
18.5	7.354	18.75	-0.34	19.00	0.20
19.0	7.185	19.25	-0.24	19.63	0.05
19.5	7.066	20.00	-0.20	20.50	0.05
20.5	6.866	21.00	-0.15	21.50	0.02
21.5	6.712	22.00	-0.14	22.50	0.04
22.5	6.576	23.00	-0.09	23.50	0.01
23.5	6.484	24.00	-0.08	24.50	-0.01
24.5	6.404	25.00	-0.09	25.50	-0.01
25.5	6.314	26.00	-0.10	26.50	0.04
26.5	6.218	27.00	-0.06	27.50	-0.03
27.5	6.159	28.00	-0.09	28.50	-0.02
28.5	6.071	29.00	-0.11	29.50	0.05
29.5	5.965	30.00	-0.05	30.50	-0.06
30.5	5.911	31.00	-0.11	31.38	0.01
31.5	5.798	31.75	-0.10	32.00	0.01
32.0	5.746	32.25	-0.10	32.50	-0.17
32.5	5.696	32.75	-0.19	33.00	0.06
33.0	5.603	33.25	-0.15	33.50	-0.37
33.5	5.526	33.75	-0.34	33.97	-0.01
34.0	5.356	34.20	-0.34	34.35	-0.78
34.4	5.218	34.50	-0.58	34.60	-2.05
34.6	5.102	34.70	-0.99	34.80	-1.50
34.8	4.904	34.90	-1.29	35.00	-14.70
35.0	4.646	35.10	-4.23	35.20	-3.25
35.2	3.800	35.30	-4.88	35.45	12.20
35.4	2.824	35.60	-1.22	35.75	2.40

TABLE 49. SPENT 600 MICRON SODIUM BICARBONATE MEDIA - TITRATION 3
(continued).

<u>ml 0.984M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d²(pH)/d(ml)²</u>
35.8	2.336	35.90	-0.50	36.20	0.33
36.0	2.236	36.50	-0.30	37.00	0.12
37.0	1.935	37.50	-0.18	38.00	0.08
38.0	1.756	38.50	-0.10	39.00	0.02
39.0	1.660	39.50	-0.08	29.75	-0.01
40.0	1.580	20.00	0.04	10.00	0.00

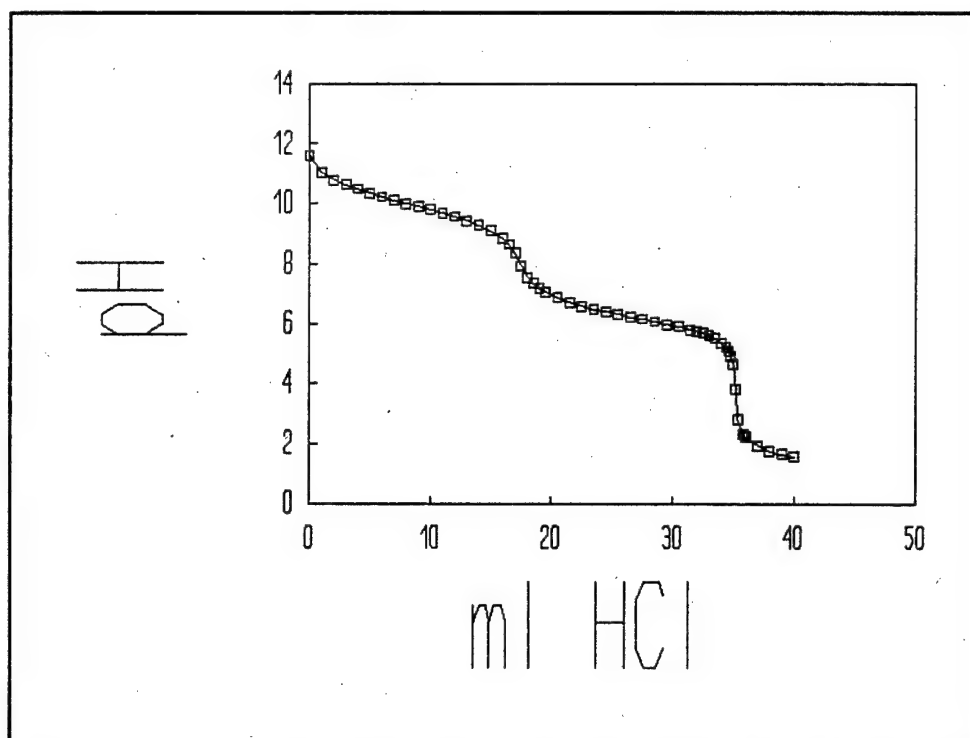


Figure C-145. Curve For The Third Titration Of Spent 600 Micron Sodium Bicarbonate Media With 0.984 M HCl.

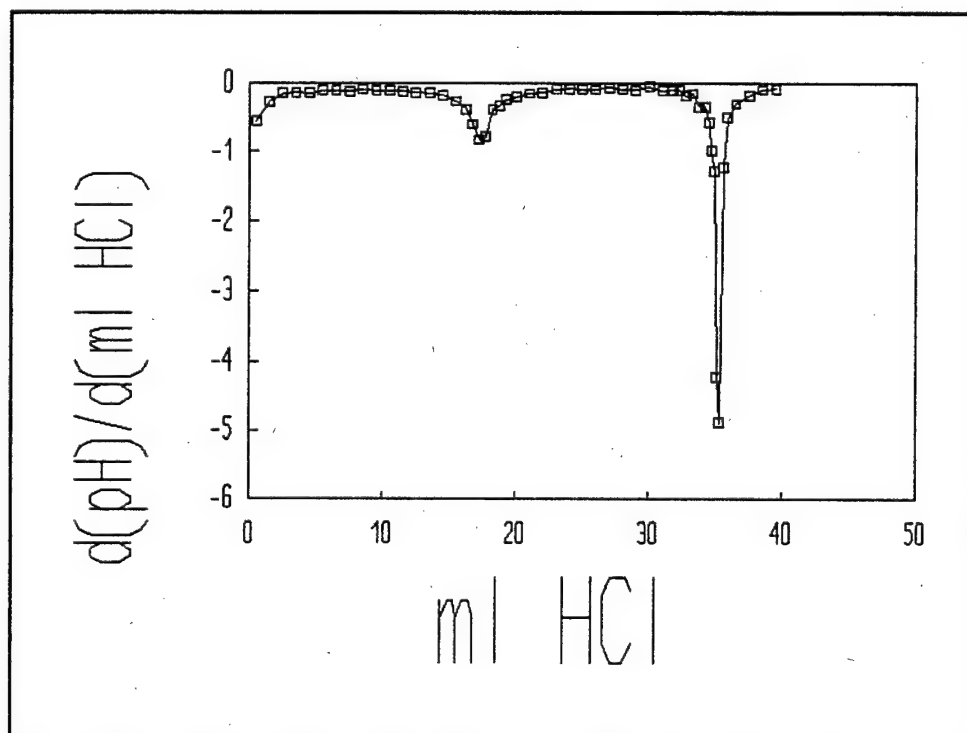


Figure C-146. First Derivative Of The Third Titration Curve For Titration Of Spent 600 Micron Sodium Bicarbonate Media With 0.984 M HCl.

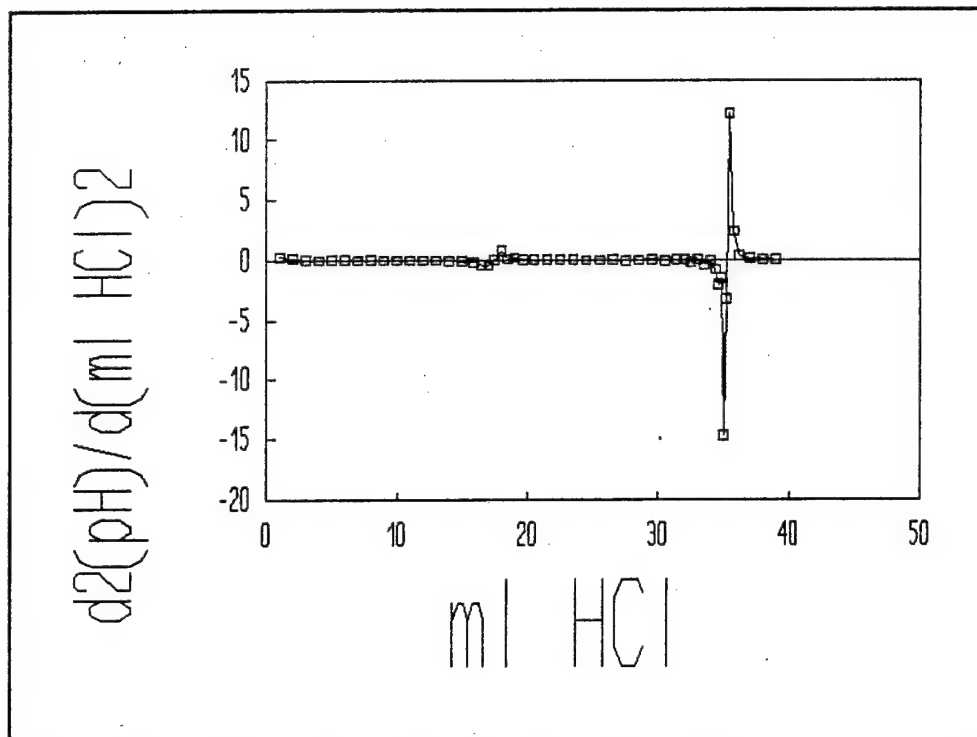


Figure C-147. Second Derivative Of The Third Titration Curve For Titration Of Spent 600 Micron Sodium Bicarbonate Media With 0.984 M HCl.

TABLE 50. SPENT 600 MICRON SODIUM BICARBONATE MEDIA - TITRATION 4.

<u>ml 0.984M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d²(pH)/d(ml)²</u>
0.0	11.625	0.05	-0.46	1.00	0.23
1.0	11.164	1.50	-0.23	2.00	-0.02
2.0	10.936	2.50	-0.24	3.00	0.07
3.0	10.693	3.50	-0.17	4.00	0.03
4.0	10.518	4.50	-0.14	5.00	0.02
5.0	10.376	5.50	-0.13	6.00	0.02
6.0	10.250	6.50	-0.11	7.00	0.00
7.0	10.140	7.50	-0.11	8.00	-0.01
8.0	10.034	8.50	-0.12	9.00	0.03
9.0	9.913	9.50	-0.09	10.00	-0.03
10.0	9.820	10.50	-0.12	11.00	0.02
11.0	9.699	11.50	-0.10	12.00	-0.03
12.0	9.596	12.50	-0.14	13.00	-0.02
13.0	9.460	13.50	-0.15	14.00	-0.02
14.0	9.308	14.50	-0.18	15.00	-0.12
15.0	9.132	15.50	-0.29	15.88	-0.07
16.0	8.838	16.25	-0.35	16.50	-0.34
16.5	8.663	16.75	-0.52	17.00	-0.54
17.0	8.403	17.25	-0.79	17.50	-0.18
17.5	8.009	17.75	-0.88	18.00	0.98
18.0	7.571	18.25	-0.39	18.50	0.34
18.5	7.377	18.75	-0.22	19.00	-0.15
19.0	7.268	19.25	-0.29	19.50	0.18
19.5	7.121	19.75	-0.20	20.13	0.06
20.0	7.019	20.50	-0.16	21.00	0.01
21.0	6.862	21.50	-0.14	22.00	0.05
22.0	6.718	22.50	-0.10	23.00	0.00
23.0	6.620	23.50	-0.10	24.00	0.02
24.0	6.524	24.50	-0.07	25.00	0.00
25.0	6.450	25.50	-0.07	26.00	-0.02
26.0	6.380	26.50	-0.09	27.00	0.03
27.0	6.287	27.50	-0.06	28.00	-0.04
28.0	6.228	28.50	-0.10	29.00	-0.01
29.0	6.129	29.50	-0.11	30.00	0.12
30.0	6.022	30.50	0.01	31.00	-0.18
31.0	6.033	31.50	-0.17	32.00	-0.03
32.0	5.861	32.50	-0.21	32.83	0.10
33.0	5.655	33.15	-0.14	33.33	0.12
33.3	5.612	33.50	-0.10	33.68	-0.42
33.7	5.571	33.85	-0.25	34.00	-0.46
34.0	5.496	34.15	-0.39	34.30	-0.29
34.3	5.380	34.45	-0.47	34.63	-1.75
34.6	5.238	34.80	-1.08	34.95	-8.78
35.0	4.804	35.10	-3.72	35.18	-27.33
35.2	4.060	35.25	-7.82	35.33	33.47
35.3	3.278	35.40	-2.80	35.50	9.15
35.5	2.718	35.60	-0.97	35.72	1.05

TABLE 50. SPENT 600 MICRON SODIUM BICARBONATE MEDIA - TITRATION 4
(continued).

<u>ml 0.984M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d²(pH)/d(ml)²</u>
35.7	2.524	35.85	-0.71	36.18	0.53
36.0	2.312	36.50	-0.36	37.00	0.21
37.0	1.949	37.50	-0.16	38.00	0.05
38.0	1.792	38.50	-0.11	39.00	0.02
39.0	1.687	39.50	-0.09	29.75	-0.01
40.0	1.601	20.00	0.04	10.00	0.00

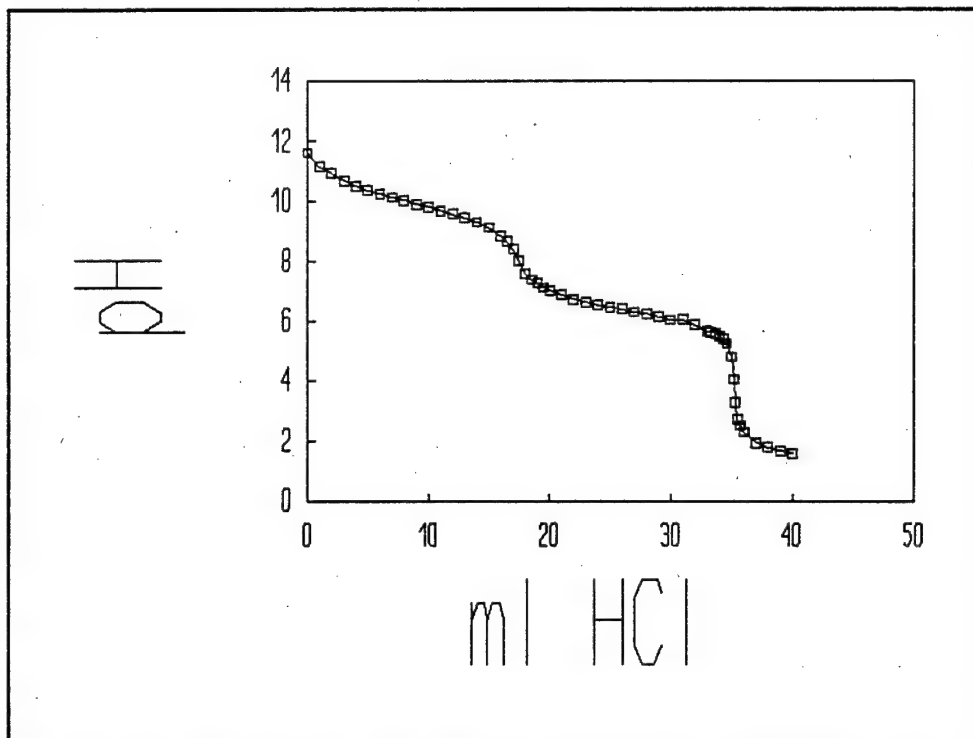


Figure C-148. Curve For The Fourth Titration Of Spent 600 Micron Sodium Bicarbonate Media With 0.984 M HCl.

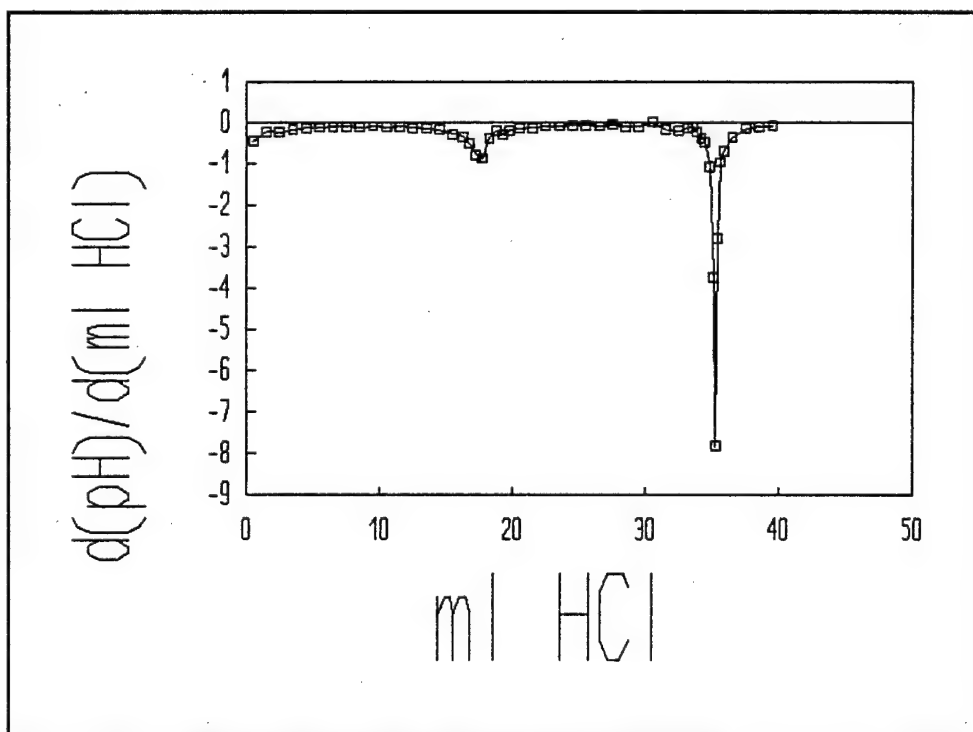


Figure C-149. First Derivative Of The Fourth Titration Curve For Titration Of Spent 600 Micron Sodium Bicarbonate Media With 0.984 M HCl.

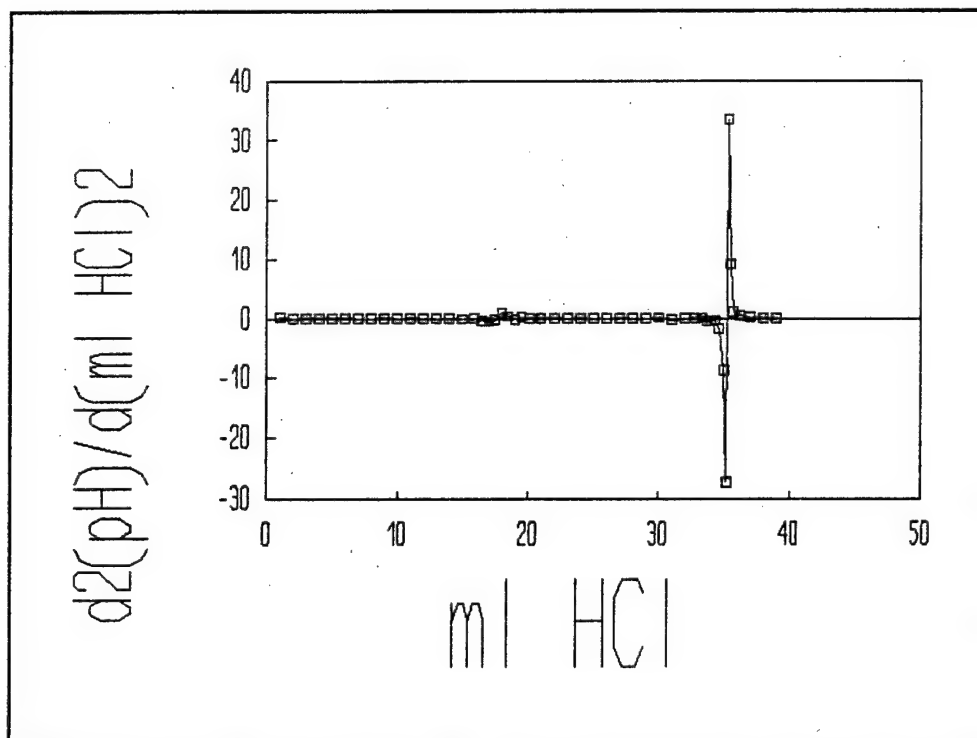


Figure C-150. Second Derivative Of The Fourth Titration Curve For Titration Of Spent 600 Micron Sodium Bicarbonate Media With 0.984 M HCl.

TABLE 51. SPENT 425 MICRON SODIUM BICARBONATE MEDIA - TITRATION 1.

<u>ml 0.984M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	10.735	0.50	-0.15	1.00	-0.02
1.0	10.589	1.50	-0.16	2.00	0.02
2.0	10.428	2.50	-0.14	3.00	-0.02
3.0	10.287	3.50	-0.16	4.00	0.05
4.0	10.129	4.50	-0.11	5.00	0.00
5.0	10.023	5.50	-0.10	6.00	-0.01
6.0	9.920	6.50	-0.11	7.00	0.01
7.0	9.811	7.50	-0.10	8.00	0.01
8.0	9.714	8.50	-0.09	9.00	-0.07
9.0	9.624	9.50	-0.16	10.00	0.02
10.0	9.466	10.50	-0.14	11.00	-0.07
11.0	9.330	11.50	-0.20	12.00	-0.02
12.0	9.126	12.50	-0.22	13.00	-0.22
13.0	8.904	13.50	-0.44	14.00	-0.30
14.0	8.464	14.50	-0.74	15.00	0.29
15.0	7.724	15.50	-0.45	15.88	0.28
16.0	7.276	16.25	-0.24	16.50	0.04
16.5	7.158	16.75	-0.22	17.13	0.02
17.0	7.050	17.50	-0.20	18.00	0.06
18.0	6.846	18.50	-0.14	19.00	0.04
19.0	6.706	19.50	-0.10	20.00	0.01
20.0	6.606	20.50	-0.09	21.00	0.00
21.0	6.514	21.50	-0.09	22.00	0.01
22.0	6.425	22.50	-0.08	23.00	0.00
23.0	6.346	23.50	-0.07	24.00	0.01
24.0	6.271	24.50	-0.06	25.00	-0.04
25.0	6.211	25.50	-0.10	26.00	0.03
26.0	6.115	26.50	-0.07	27.00	-0.01
27.0	6.044	27.50	-0.08	28.00	-0.03
28.0	5.963	28.50	-0.12	29.00	-0.02
29.0	5.848	29.50	-0.13	29.83	0.24
30.0	5.717	30.15	0.03	30.28	-0.49
30.3	5.725	30.40	-0.09	30.50	0.18
30.5	5.706	30.60	-0.06	30.73	-1.00
30.7	5.694	30.85	-0.31	31.05	0.06
31.0	5.601	31.25	-0.29	31.45	-0.08
31.5	5.457	31.65	-0.32	31.78	-1.40
31.8	5.361	31.90	-0.67	32.03	1.59
32.0	5.227	32.15	-0.27	32.30	-2.74
32.3	5.145	32.45	-1.10	32.57	-10.61
32.6	4.816	32.70	-3.75	32.80	-9.07
32.8	4.066	32.90	-5.56	33.08	12.17
33.0	2.953	33.25	-1.30	33.50	1.67
33.5	2.301	33.75	-0.47	34.13	0.36
34.0	2.066	34.50	-0.20	35.00	0.06
35.0	1.864	35.50	-0.14	36.00	0.05
36.0	1.720	36.50	-0.09	37.00	0.02

TABLE 51. SPENT 425 MICRON SODIUM BICARBONATE MEDIA - TITRATION 1
(continued).

<u>ml 0.984M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d²(pH)/d(ml)²</u>
37.0	1.630	37.50	-0.07	38.00	0.02
38.0	1.557	38.50	-0.05	39.00	0.00
39.0	1.504	39.50	-0.05	29.75	-0.00
40.0	1.455	20.00	0.04	10.00	0.00

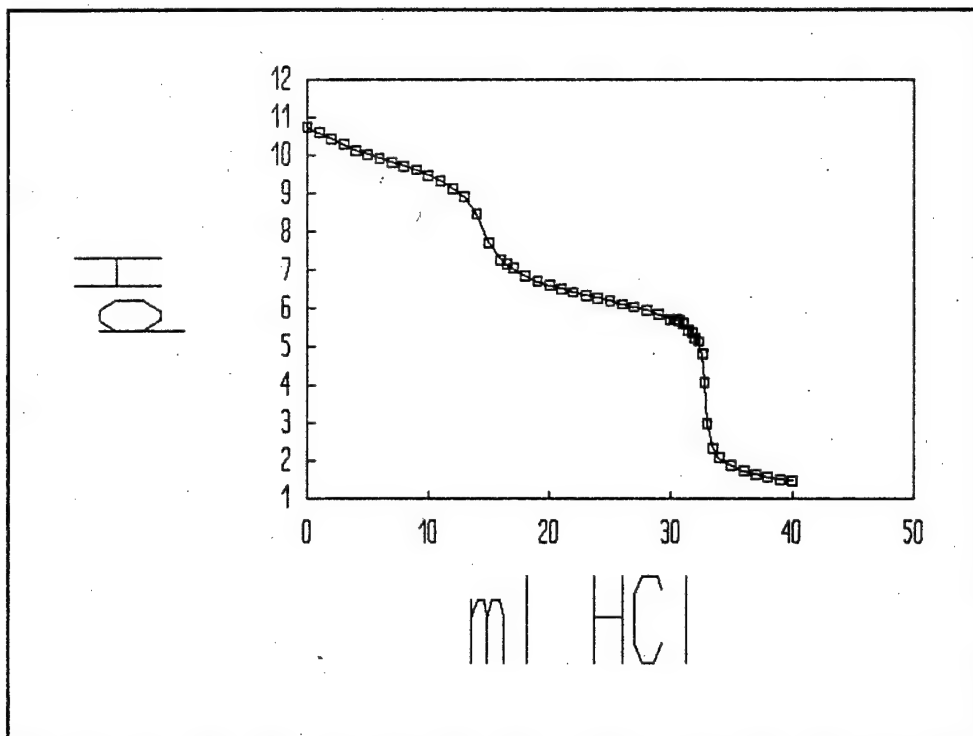


Figure C-151. Curve For The First Titration Of Spent 450 Micron Sodium Bicarbonate Media With 0.984 M HCl.

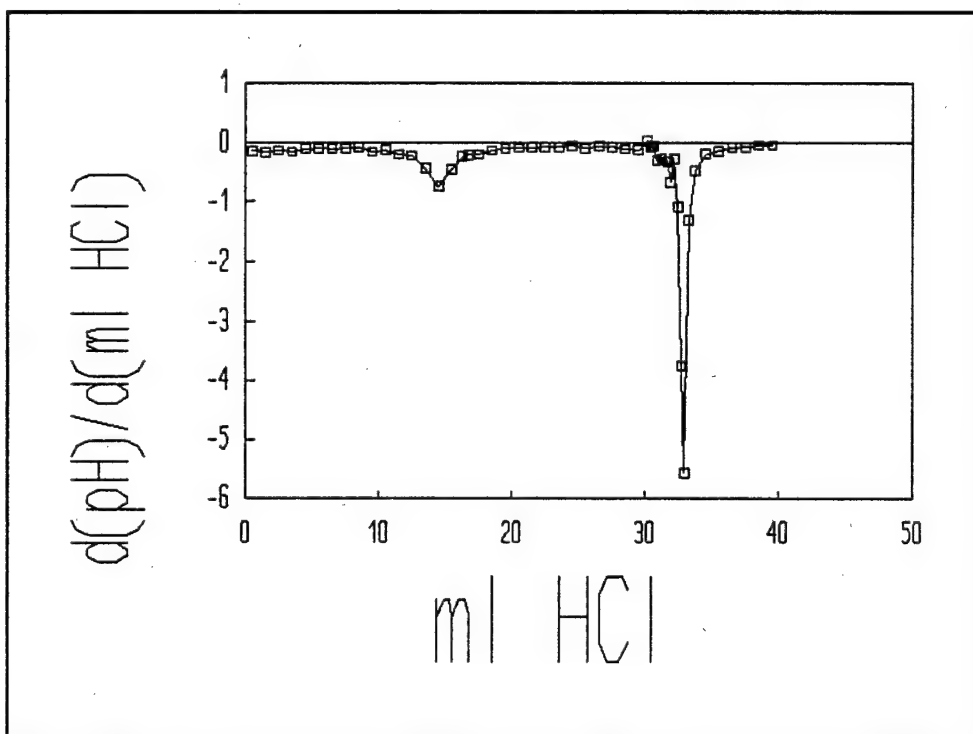


Figure C-152. First Derivative Of The First Titration Curve For Titration Of Spent 450 Micron Sodium Bicarbonate Media With 0.984 M HCl.

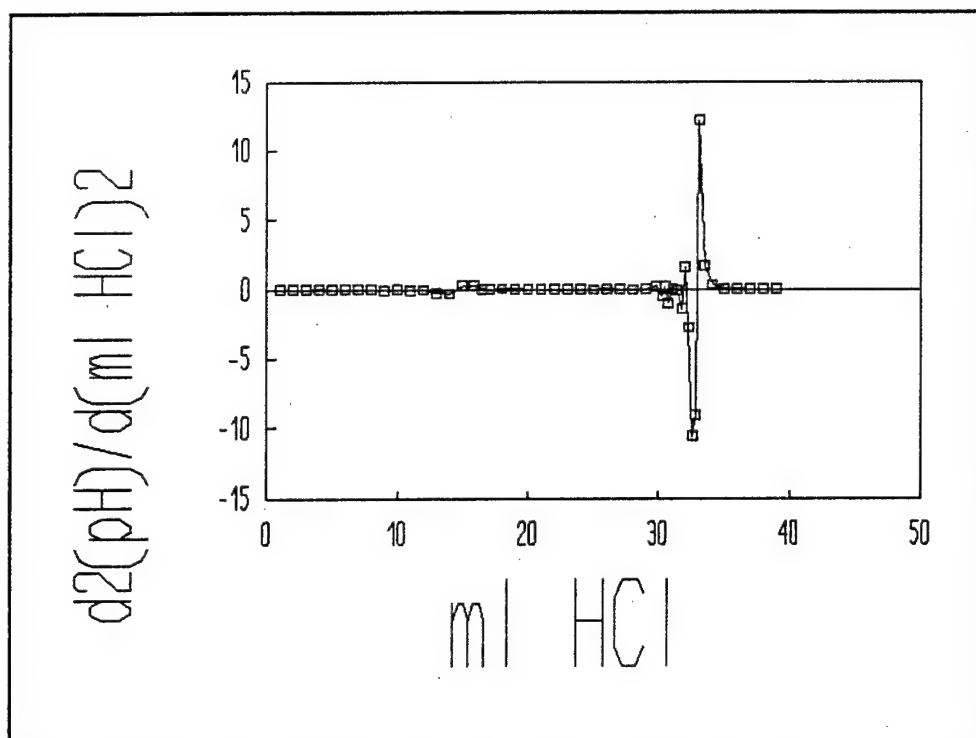


Figure C-253. Second Derivative Of The First Titration Curve For Titration Of Spent 450 Micron Sodium Bicarbonate Media With 0.984 M HCl.

TABLE 52. SPENT 425 MICRON SODIUM BICARBONATE MEDIA - TITRATION 2.

<u>ml 0.984M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	10.358	0.05	-0.01	1.00	-0.17
1.0	10.344	1.50	-0.18	2.00	0.21
2.0	10.162	2.50	0.03	3.00	-0.17
3.0	10.189	3.50	-0.14	4.00	-0.00
4.0	10.048	4.50	-0.14	5.00	0.07
5.0	9.904	5.50	-0.07	6.00	-0.01
6.0	9.829	6.50	-0.08	7.00	-0.07
7.0	9.748	7.50	-0.15	8.00	0.06
8.0	9.595	8.50	-0.09	9.00	-0.12
9.0	9.505	9.50	-0.21	10.00	0.03
10.0	9.293	10.50	-0.18	11.00	-0.03
11.0	9.116	11.50	-0.21	12.00	-0.53
12.0	8.904	12.50	-0.74	12.88	0.21
13.0	8.159	13.25	-0.59	13.50	-0.19
13.5	7.864	13.75	-0.68	14.00	0.64
14.0	7.522	14.25	-0.36	14.50	0.25
14.5	7.341	14.75	-0.24	15.00	-0.09
15.0	7.222	15.25	-0.28	15.50	0.52
15.5	7.081	15.75	-0.02	16.13	-0.28
16.0	7.070	16.50	-0.23	17.00	0.10
17.0	6.836	17.50	-0.13	18.00	0.15
18.0	6.704	18.50	0.02	19.00	-0.14
19.0	6.722	19.50	-0.12	20.00	0.01
20.0	6.604	20.50	-0.11	21.00	0.09
21.0	6.497	21.50	-0.01	22.00	-0.09
22.0	6.483	22.50	-0.10	23.00	-0.06
23.0	6.383	23.50	-0.16	24.00	0.07
24.0	6.219	24.50	-0.10	25.00	0.02
25.0	6.121	25.50	-0.08	26.00	-0.01
26.0	6.039	26.50	-0.09	27.00	0.00
27.0	5.945	27.50	-0.09	28.00	-0.05
28.0	5.852	28.50	-0.15	29.00	-0.04
29.0	5.704	29.50	-0.19	29.88	0.01
30.0	5.516	30.25	-0.18	30.50	-0.25
30.5	5.426	30.75	-0.30	30.95	-0.71
31.0	5.274	31.15	-0.59	31.25	4.73
31.3	5.098	31.35	0.36	31.45	-3.05
31.4	5.134	31.55	-0.25	31.70	-8.02
31.7	5.059	31.85	-2.66	31.97	-14.25
32.0	4.262	32.10	-6.22	32.22	19.29
32.2	3.018	32.35	-1.40	32.47	1.77
32.5	2.599	32.60	-0.95	32.72	2.41
32.7	2.408	32.85	-0.35	33.18	0.02
33.0	2.302	33.50	-0.34	34.00	0.18
34.0	1.961	34.50	-0.16	35.00	0.06
35.0	1.804	35.50	-0.10	36.00	0.03
36.0	1.706	36.50	-0.07	37.00	0.01

TABLE 52. SPENT 425 MICRON SODIUM BICARBONATE MEDIA - TITRATION 2
(continued).

<u>ml 0.984M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
37.0	1.636	37.50	-0.06	38.00	0.00
38.0	1.581	38.50	-0.05	39.00	0.01
39.0	1.530	39.50	-0.04	29.75	-0.00
40.0	1.486	20.00	0.04	10.00	0.00

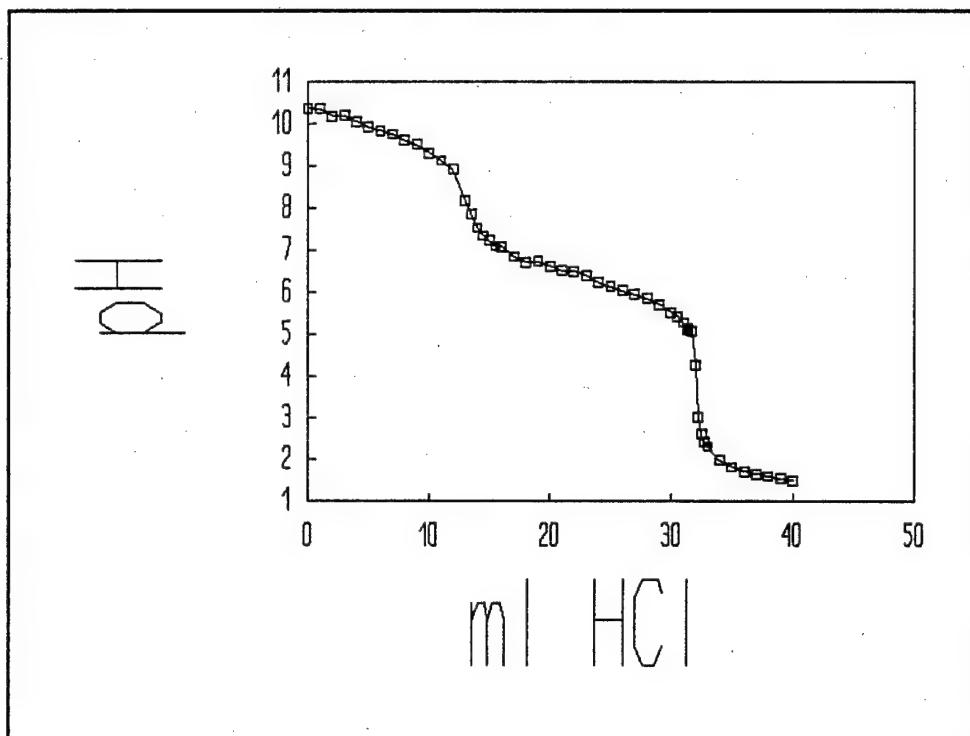


Figure C-154. Curve For The Second Titration Of Spent 450 Micron Sodium Bicarbonate Media With 0.984 M HCl.

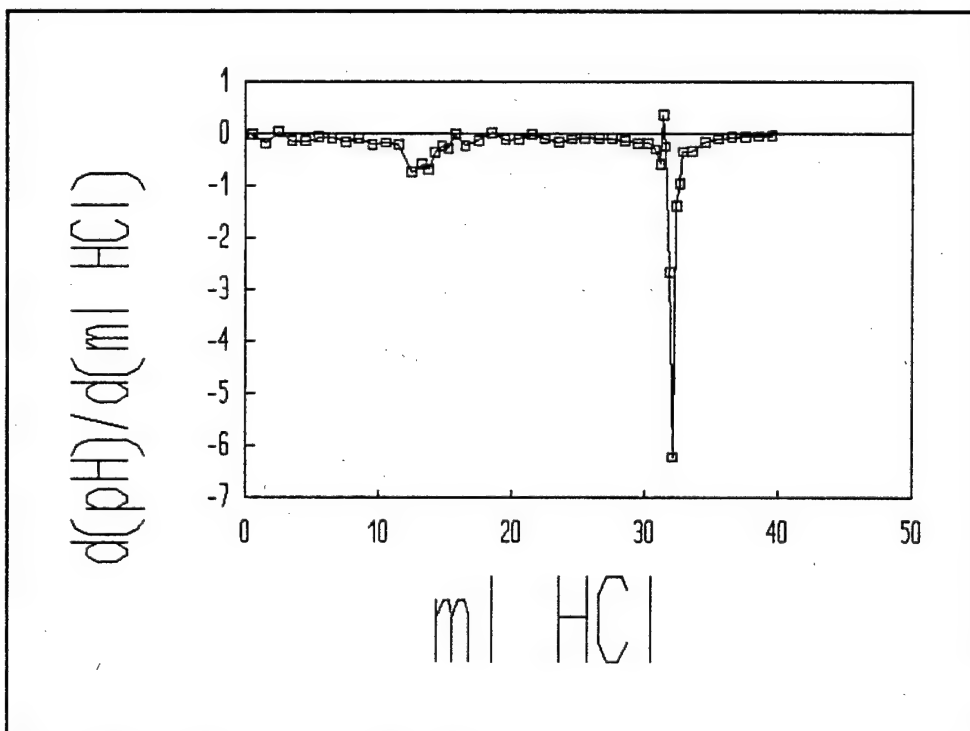


Figure C-155. First Derivative Of The Second Titration Curve For Titration Of Spent 450 Micron Sodium Bicarbonate Media With 0.984 M HCl.

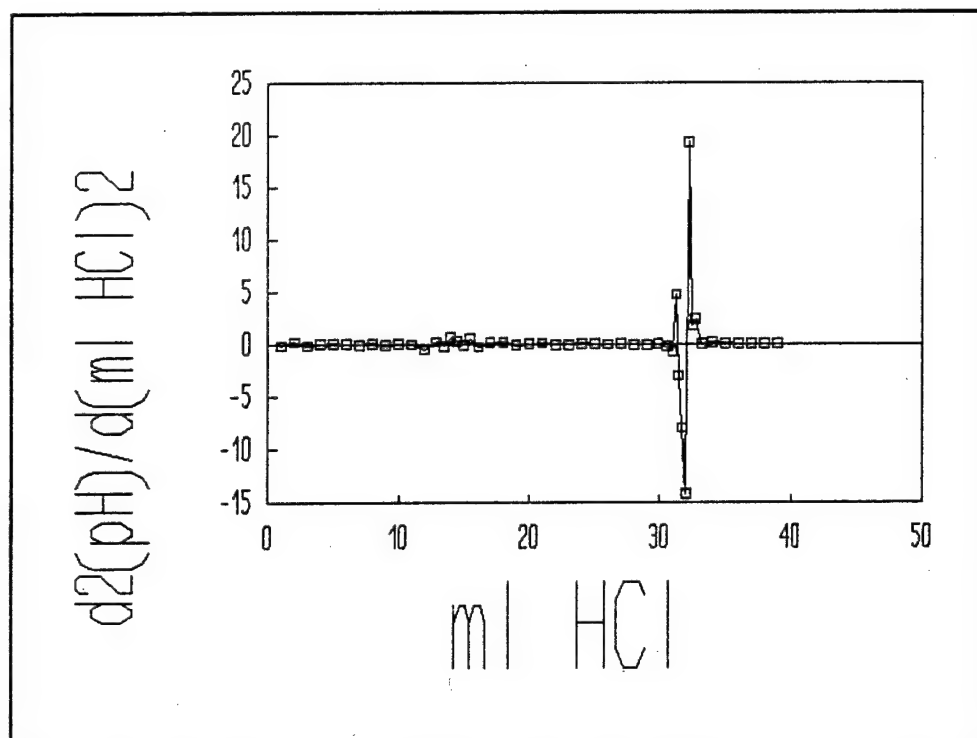


Figure C-156. Second Derivative Of The Second Titration Curve For Titration Of Spent 450 Micron Sodium Bicarbonate Media With 0.984 M HCl.

TABLE 53. SPENT 425 MICRON SODIUM BICARBONATE MEDIA - TITRATION 3.

<u>ml 0.984M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	10.564	0.50	-0.15	1.00	0.01
1.0	10.409	1.50	-0.15	2.00	0.02
2.0	10.259	2.50	-0.13	3.00	0.01
3.0	10.129	3.50	-0.12	4.00	0.02
4.0	10.008	4.50	-0.10	5.00	-0.05
5.0	9.910	5.50	-0.15	6.00	0.06
6.0	9.760	6.50	-0.09	7.00	-0.04
7.0	9.667	7.50	-0.14	8.00	-0.00
8.0	9.530	8.50	-0.14	9.00	-0.03
9.0	9.391	9.50	-0.17	10.00	-0.06
10.0	9.223	10.50	-0.23	11.00	-0.07
11.0	8.993	11.50	-0.30	11.88	-0.40
12.0	8.691	12.25	-0.60	12.50	-0.46
12.5	8.391	12.75	-0.83	13.00	0.21
13.0	7.975	13.25	-0.73	13.50	0.67
13.5	7.612	13.75	-0.39	14.00	0.12
14.0	7.416	14.25	-0.33	14.50	0.12
14.5	7.249	14.75	-0.27	15.13	0.12
15.0	7.113	15.50	-0.18	16.00	0.03
16.0	6.929	16.50	-0.16	17.00	0.04
17.0	6.771	17.50	-0.12	18.00	0.01
18.0	6.655	18.50	-0.10	19.00	0.02
19.0	6.551	19.50	-0.08	20.00	0.01
20.0	6.472	20.50	-0.07	21.00	-0.04
21.0	6.399	21.50	-0.11	22.00	0.06
22.0	6.290	22.50	-0.05	23.00	-0.04
23.0	6.237	23.50	-0.09	24.00	0.03
24.0	6.143	24.50	-0.06	25.00	-0.03
25.0	6.083	25.50	-0.09	26.00	-0.00
26.0	5.993	26.50	-0.09	27.00	-0.05
27.0	5.898	27.50	-0.15	28.00	0.03
28.0	5.751	28.50	-0.12	29.00	-0.13
29.0	5.630	29.50	-0.25	29.88	0.13
30.0	5.377	30.25	-0.16	30.50	-0.90
30.5	5.298	30.75	-0.61	31.00	-4.66
31.0	4.994	31.25	-2.94	31.50	1.63
31.5	3.524	31.75	-2.13	32.00	3.42
32.0	2.461	32.25	-0.42	32.50	0.05
32.5	2.252	32.75	-0.39	33.13	0.24
33.0	2.055	33.50	-0.21	34.00	0.11
34.0	1.841	34.50	-0.10	35.00	0.02
35.0	1.738	35.50	-0.09	36.00	0.02
36.0	1.650	36.50	-0.06	37.00	0.03
37.0	1.585	37.50	-0.04	38.00	-0.01
38.0	1.549	38.50	-0.05	39.00	0.00
39.0	1.501	39.50	-0.04	29.75	-0.00
40.0	1.457	20.00	0.04	10.00	0.00

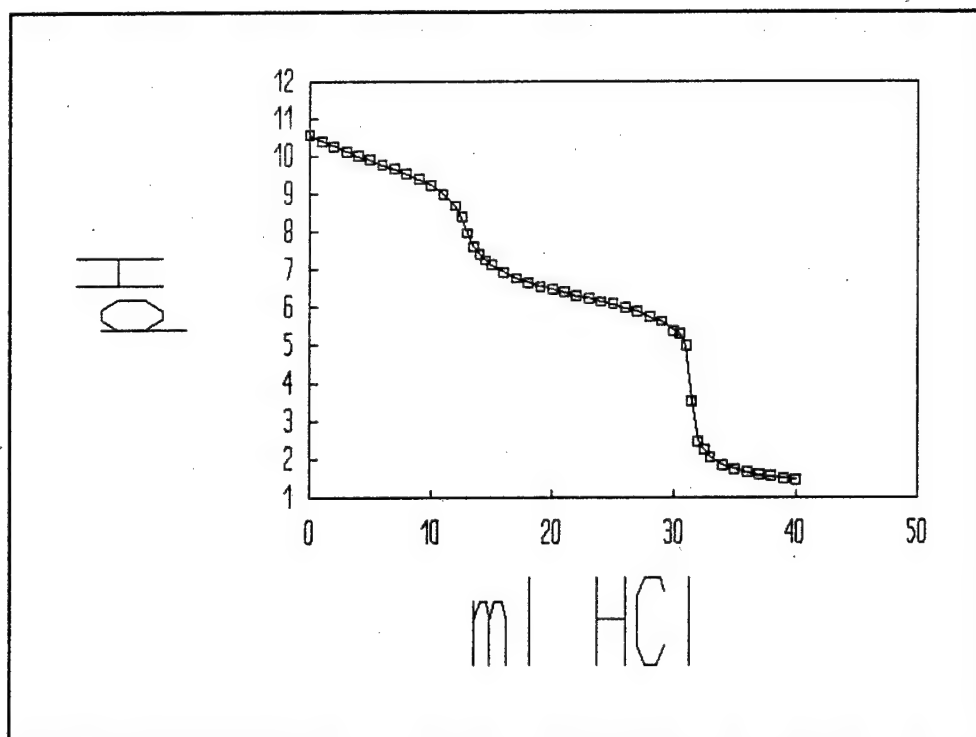


Figure C-157. Curve For The Third Titration Of Spent 450 Micron Sodium Bicarbonate Media With 0.984 M HCl.

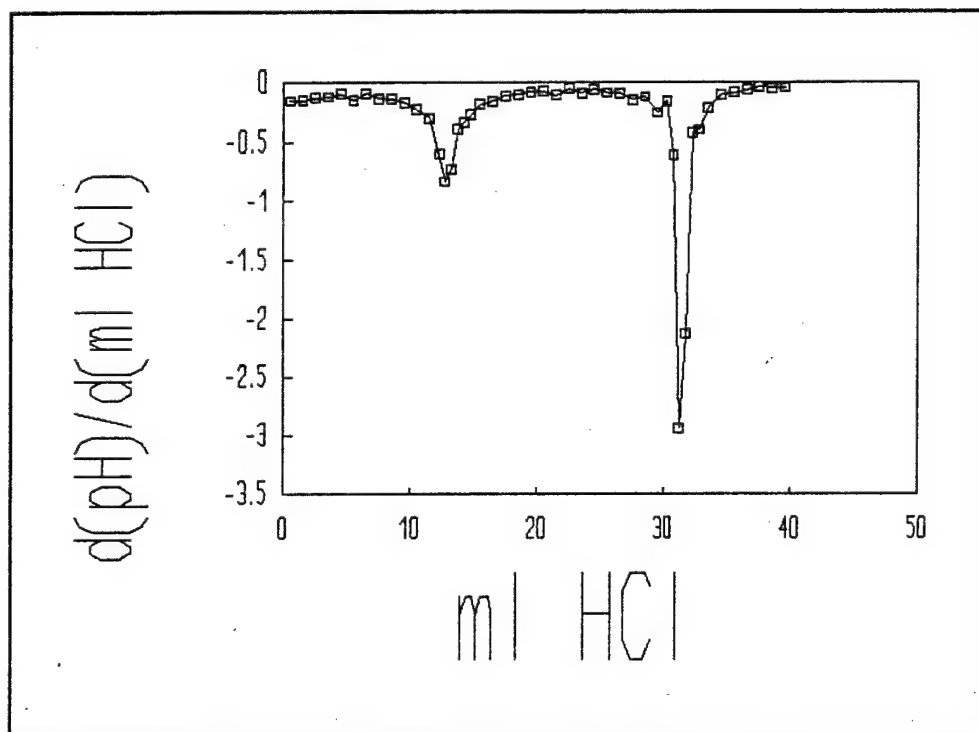


Figure C-158. First Derivative Of The Third Titration Curve For Titration Of Spent 450 Micron Sodium Bicarbonate Media With 0.984 M HCl.

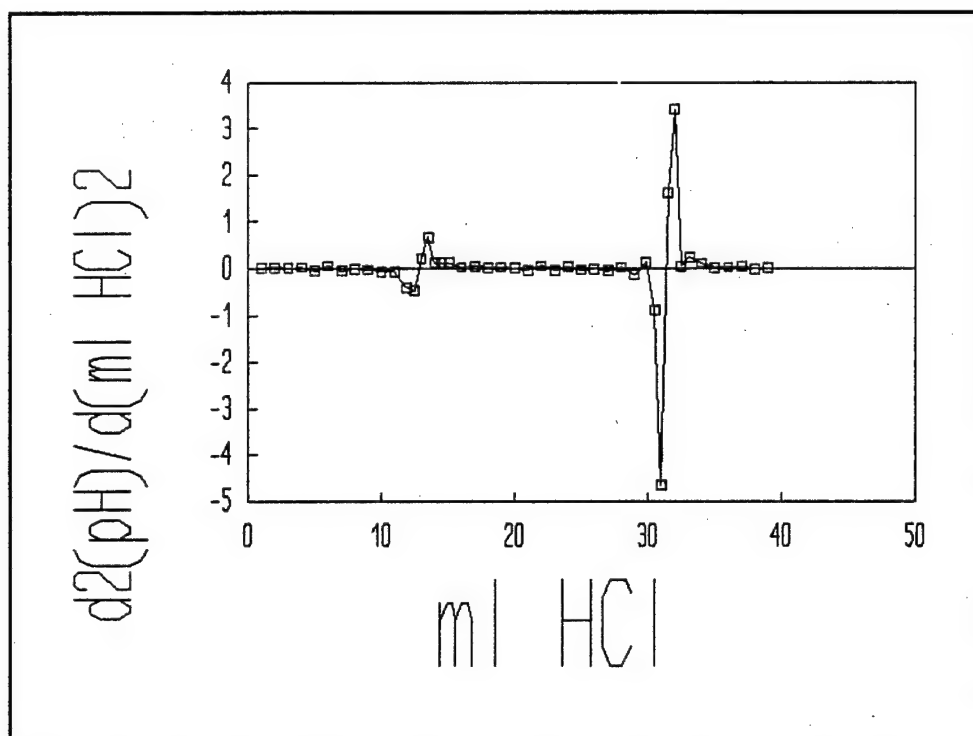


Figure C-159. Second Derivative Of The Third Titration Curve For Titration Of Spent 450 Micron Sodium Bicarbonate Media With 0.984 M HCl.

TABLE 54. SPENT 425 MICRON SODIUM BICARBONATE MEDIA - TITRATION 4.

<u>ml 0.984M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	10.353	0.50	-0.07	1.00	-0.07
1.0	10.282	1.50	-0.14	2.00	0.05
2.0	10.140	2.50	-0.09	3.00	-0.02
3.0	10.049	3.50	-0.11	4.00	0.00
4.0	9.934	4.50	-0.11	5.00	0.03
5.0	9.820	5.50	-0.09	6.00	-0.03
6.0	9.732	6.50	-0.12	7.00	0.01
7.0	9.614	7.50	-0.11	8.00	-0.02
8.0	9.504	8.50	-0.13	9.00	-0.04
9.0	9.372	9.50	-0.17	10.00	-0.02
10.0	9.199	10.50	-0.19	11.00	-0.11
11.0	9.006	11.50	-0.30	11.88	-0.53
12.0	8.706	12.25	-0.70	12.50	0.02
12.5	8.357	12.75	-0.69	13.00	-0.05
13.0	8.012	13.25	-0.72	13.50	0.49
13.5	7.654	13.75	-0.47	14.00	0.20
14.0	7.418	14.25	-0.37	14.50	0.33
14.5	7.232	14.75	-0.21	15.13	-0.01
15.0	7.128	15.50	-0.22	16.00	0.08
16.0	6.913	16.50	-0.13	17.00	0.02
17.0	6.778	17.50	-0.12	18.00	0.01
18.0	6.663	18.50	-0.10	19.00	0.02
19.0	6.560	19.50	-0.09	20.00	0.01
20.0	6.474	20.50	-0.08	21.00	0.04
21.0	6.394	21.50	-0.04	22.00	-0.06
22.0	6.355	22.50	-0.10	23.00	0.02
23.0	6.252	23.50	-0.08	24.00	0.01
24.0	6.168	24.50	-0.07	25.00	-0.02
25.0	6.097	25.50	-0.09	26.00	0.15
26.0	6.007	26.50	0.06	27.00	-0.21
27.0	6.070	27.50	-0.14	28.00	-0.06
28.0	5.926	28.50	-0.20	28.88	0.02
29.0	5.723	29.25	-0.19	29.50	-0.28
29.5	5.629	29.75	-0.33	30.00	-0.73
30.0	5.465	30.25	-0.69	30.50	0.24
30.5	5.118	30.75	-0.57	30.95	-5.65
31.0	4.832	31.15	-2.83	31.30	-5.01
31.3	3.982	31.45	-4.34	31.63	10.41
31.6	2.681	31.80	-0.69	32.15	0.49
32.0	2.404	32.50	-0.35	33.00	0.16
33.0	2.052	33.50	-0.19	34.00	0.07
34.0	1.865	34.50	-0.12	35.00	0.05
35.0	1.747	35.50	-0.07	36.00	0.01
36.0	1.678	36.50	-0.06	37.00	0.01
37.0	1.617	37.50	-0.05	38.00	0.02
38.0	1.566	38.50	-0.03	39.00	-0.01
39.0	1.532	39.50	-0.04	29.75	-0.00
40.0	1.489	20.00	0.04	10.00	0.00

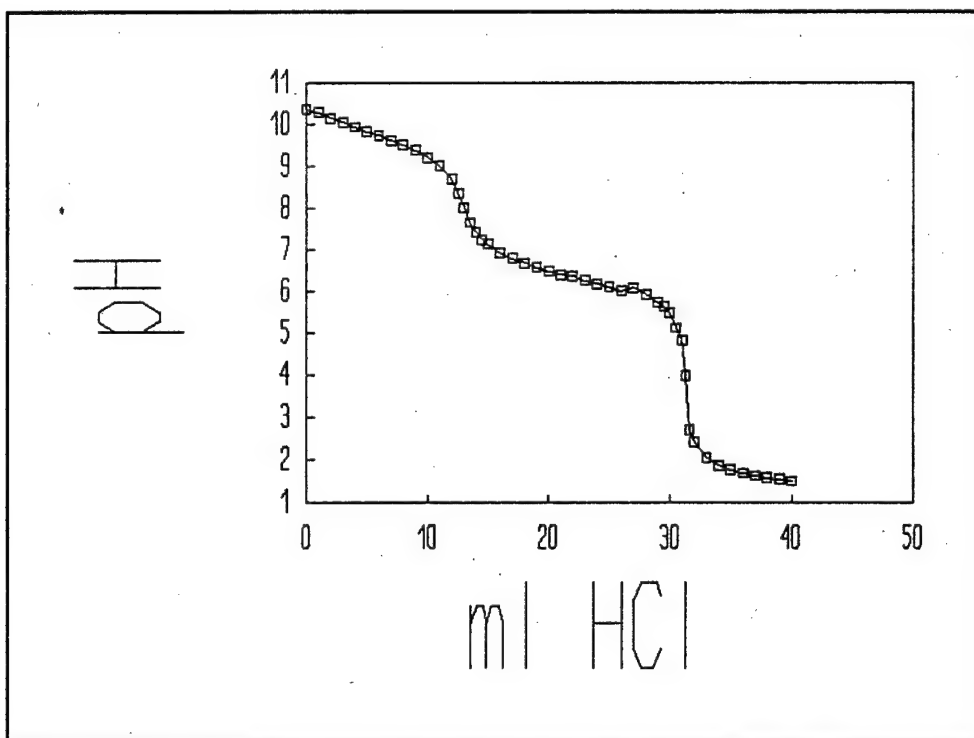


Figure C-160. Curve For The Fourth Titration Of Spent 450 Micron Sodium Bicarbonate Media With 0.984 M HCl.

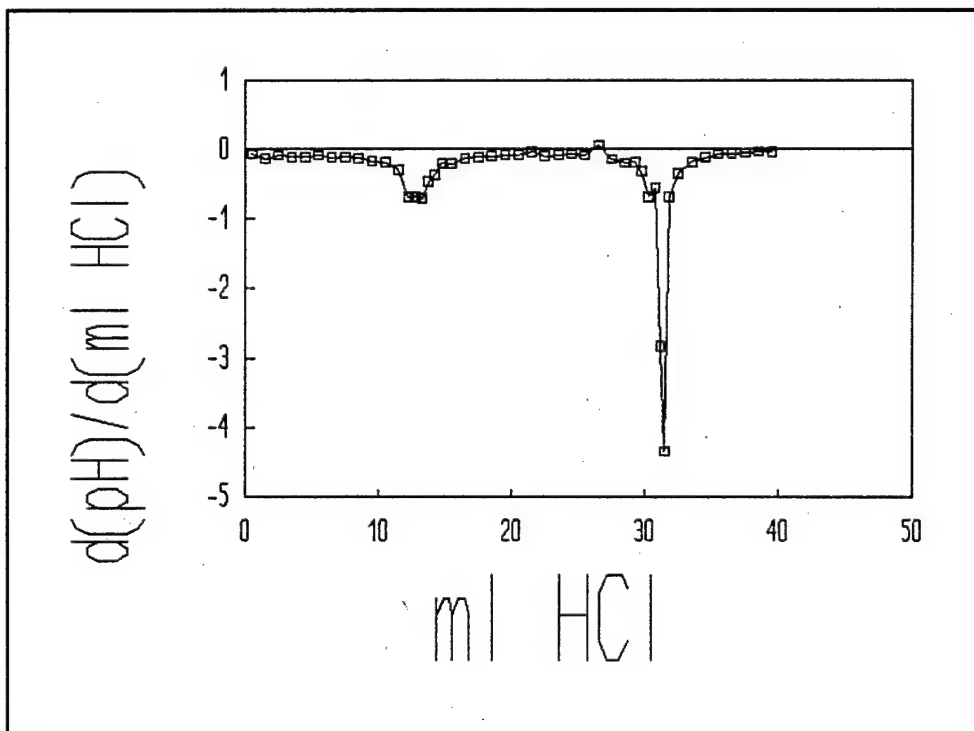


Figure C-161. First Derivative Of The Fourth Titration Curve For Titration Of Spent 450 Micron Sodium Bicarbonate Media With 0.984 M HCl.

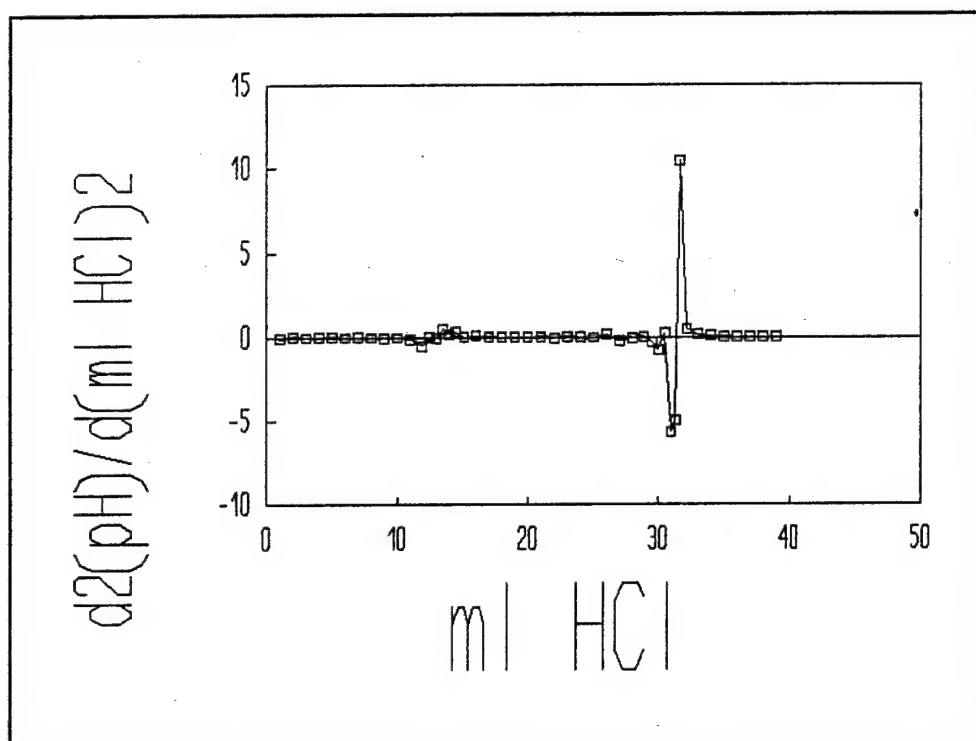


Figure C-162. Second Derivative Of The Fourth Titration Curve For Titration Of Spent 450 Micron Sodium Bicarbonate Media With 0.984 M HCl.

TABLE 55. SPENT 250 MICRON SODIUM BICARBONATE MEDIA - TITRATION 1.

<u>ml 0.984M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	10.501	0.50	-0.07	1.00	-0.07
1.0	10.431	1.50	-0.14	2.00	0.07
2.0	10.294	2.50	-0.06	3.00	0.01
3.0	10.232	3.50	-0.05	4.00	-0.02
4.0	10.182	4.50	-0.07	5.00	0.04
5.0	10.108	5.50	-0.03	6.00	-0.03
6.0	10.077	6.50	-0.06	7.00	-0.04
7.0	10.018	7.50	-0.10	8.00	-0.33
8.0	9.917	8.50	-0.43	9.00	0.28
9.0	9.483	9.50	-0.15	10.00	0.03
10.0	9.333	10.50	-0.12	11.00	-0.10
11.0	9.210	11.50	-0.22	12.00	-0.06
12.0	8.990	12.50	-0.28	12.88	-0.21
13.0	8.711	13.25	-0.43	13.50	-0.04
13.5	8.494	13.75	-0.45	14.00	-0.45
14.0	8.267	14.25	-0.68	14.50	0.08
14.5	7.928	14.75	-0.64	15.00	0.60
15.0	7.610	15.25	-0.34	15.50	-0.00
15.5	7.441	15.75	-0.34	16.13	0.14
16.0	7.271	16.50	-0.24	17.00	0.09
17.0	7.033	17.50	-0.15	18.00	0.02
18.0	6.881	18.50	-0.13	19.00	0.00
19.0	6.748	19.50	-0.13	20.00	0.03
20.0	6.618	20.50	-0.10	21.00	0.02
21.0	6.519	21.50	-0.08	22.00	-0.01
22.0	6.439	22.50	-0.09	23.00	0.02
23.0	6.347	23.50	-0.07	24.00	-0.01
24.0	6.272	24.50	-0.09	25.00	0.00
25.0	6.183	25.50	-0.09	26.00	-0.01
26.0	6.097	26.50	-0.09	27.00	-0.02
27.0	6.005	27.50	-0.11	28.00	-0.02
28.0	5.891	28.50	-0.14	29.00	-0.06
29.0	5.755	29.50	-0.19	29.88	-0.17
30.0	5.563	30.25	-0.32	30.50	0.01
30.5	5.404	30.75	-0.31	30.95	-0.81
31.0	5.248	31.15	-0.64	31.30	-2.21
31.3	5.057	31.45	-1.30	31.63	-7.61
31.6	4.667	31.80	-3.96	32.03	5.74
32.0	3.082	32.25	-1.38	32.50	1.94
32.5	2.393	32.75	-0.41	33.13	0.24
33.0	2.190	33.50	-0.22	34.00	0.07
34.0	1.966	34.50	-0.15	26.00	-0.01
35.0	1.816	17.50	0.05	8.75	0.00

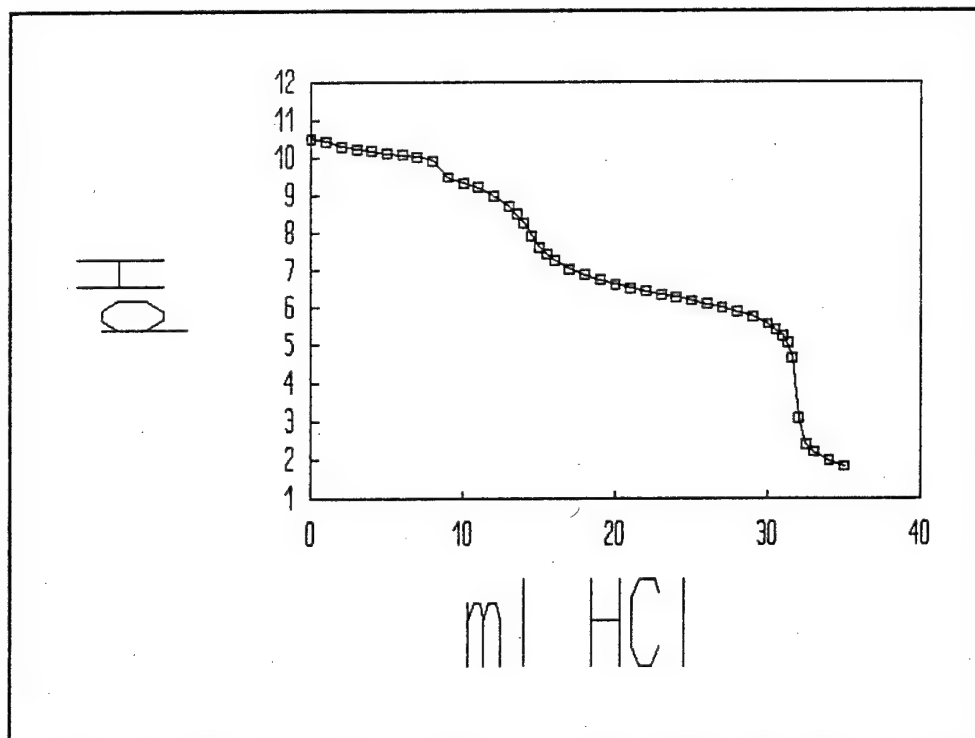


Figure C-163. Curve For The First Titration Of Spent 250 Micron Sodium Bicarbonate Media With 0.984 M HCl.

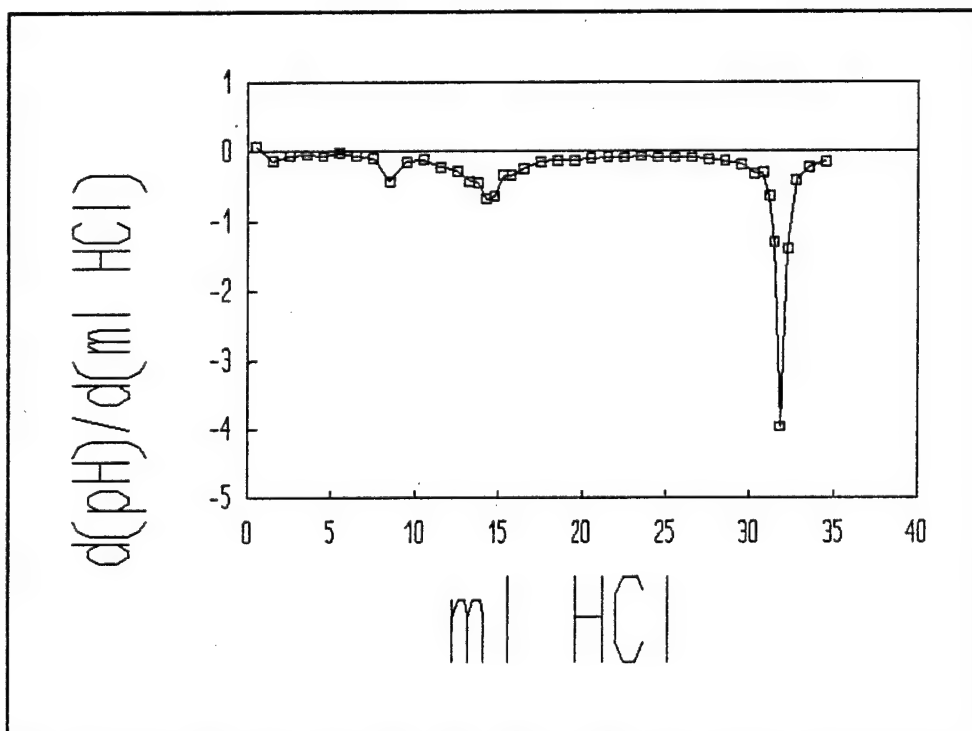


Figure C-164. First Derivative Of The First Titration Curve For Titration Of Spent 250 Micron Sodium Bicarbonate Media With 0.984 M HCl.

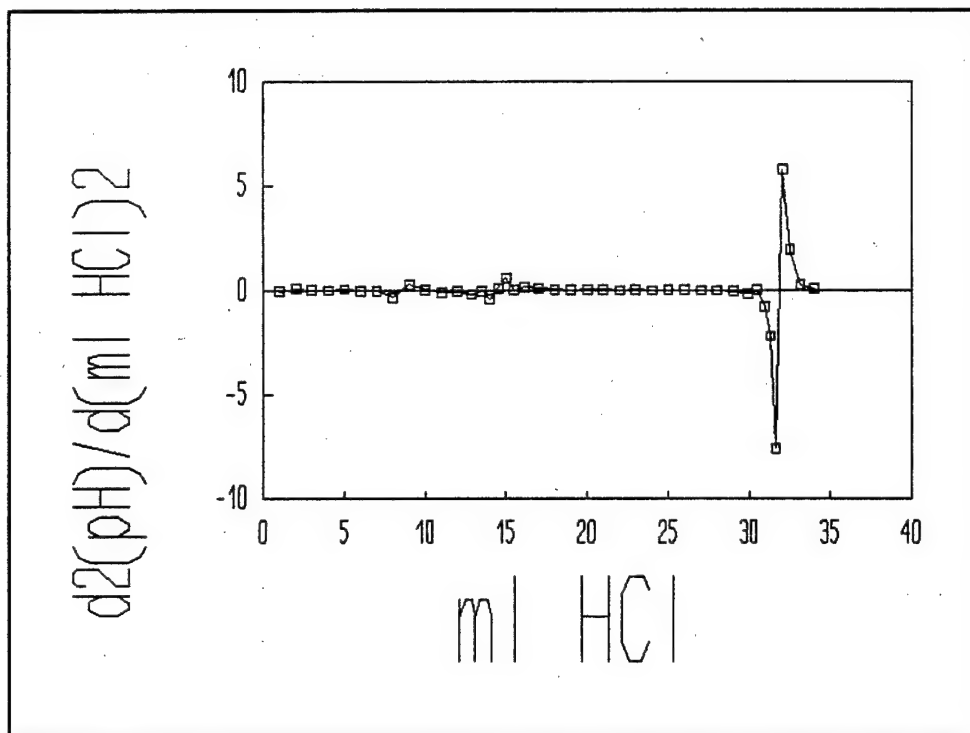


Figure C-165. Second Derivative Of The First Titration Curve For Titration Of Spent 250 Micron Sodium Bicarbonate Media With 0.984 M HCl.

TABLE 56. SPENT 250 MICRON SODIUM BICARBONATE MEDIA - TITRATION 2.

<u>ml 0.984M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d²(pH)/d(ml)²</u>
0.0	10.495	0.50	-0.10	1.00	-0.03
1.0	10.400	1.50	-0.12	2.00	0.03
2.0	10.279	2.50	-0.09	3.00	-0.06
3.0	10.185	3.50	-0.15	4.00	0.06
4.0	10.033	4.50	-0.09	5.00	0.01
5.0	9.941	5.50	-0.08	6.00	-0.04
6.0	9.860	6.50	-0.13	7.00	0.04
7.0	9.735	7.50	-0.08	8.00	-0.01
8.0	9.652	8.50	-0.09	9.00	-0.02
9.0	9.563	9.50	-0.11	10.00	0.00
10.0	9.452	10.50	-0.11	11.00	-0.06
11.0	9.345	11.50	-0.17	12.00	-0.05
12.0	9.179	12.50	-0.21	13.00	-0.04
13.0	8.965	13.50	-0.26	13.88	-0.44
14.0	8.709	14.25	-0.59	14.50	-0.20
14.5	8.415	14.75	-0.69	15.00	0.25
15.0	8.071	15.25	-0.56	15.50	0.25
15.5	7.789	15.75	-0.44	16.00	0.21
16.0	7.569	16.25	-0.33	16.50	0.31
16.5	7.402	16.75	-0.18	17.13	-0.02
17.0	7.312	17.50	-0.19	18.00	0.06
18.0	7.120	18.50	-0.14	19.00	0.00
19.0	6.983	19.50	-0.13	20.00	0.00
20.0	6.849	20.50	-0.13	21.00	0.00
21.0	6.716	21.50	-0.13	22.00	0.04
22.0	6.586	22.50	-0.09	23.00	0.01
23.0	6.493	23.50	-0.08	24.00	-0.01
24.0	6.414	24.50	-0.09	25.00	-0.01
25.0	6.322	25.50	-0.10	26.00	-0.01
26.0	6.224	26.50	-0.11	27.00	0.02
27.0	6.113	27.50	-0.09	28.00	-0.05
28.0	6.020	28.50	-0.14	29.00	-0.02
29.0	5.880	29.50	-0.16	30.00	-0.04
30.0	5.723	30.50	-0.19	30.88	0.23
31.0	5.528	31.25	-0.02	31.50	-0.48
31.5	5.517	31.75	-0.26	31.95	-0.56
32.0	5.385	32.15	-0.49	32.28	-0.87
32.3	5.239	32.40	-0.70	32.50	-1.45
32.5	5.098	32.60	-0.99	32.72	-2.57
32.7	4.899	32.85	-1.64	32.97	-17.63
33.0	4.408	33.10	-6.04	33.20	19.30
33.2	3.199	33.30	-2.18	33.43	5.02
33.4	2.762	33.55	-0.93	33.70	1.18
33.7	2.483	33.85	-0.58	34.05	0.47
34.0	2.310	34.25	-0.39	34.50	0.34
34.5	2.116	34.75	-0.22	26.13	-0.02
35.0	2.008	17.50	0.06	8.75	0.00

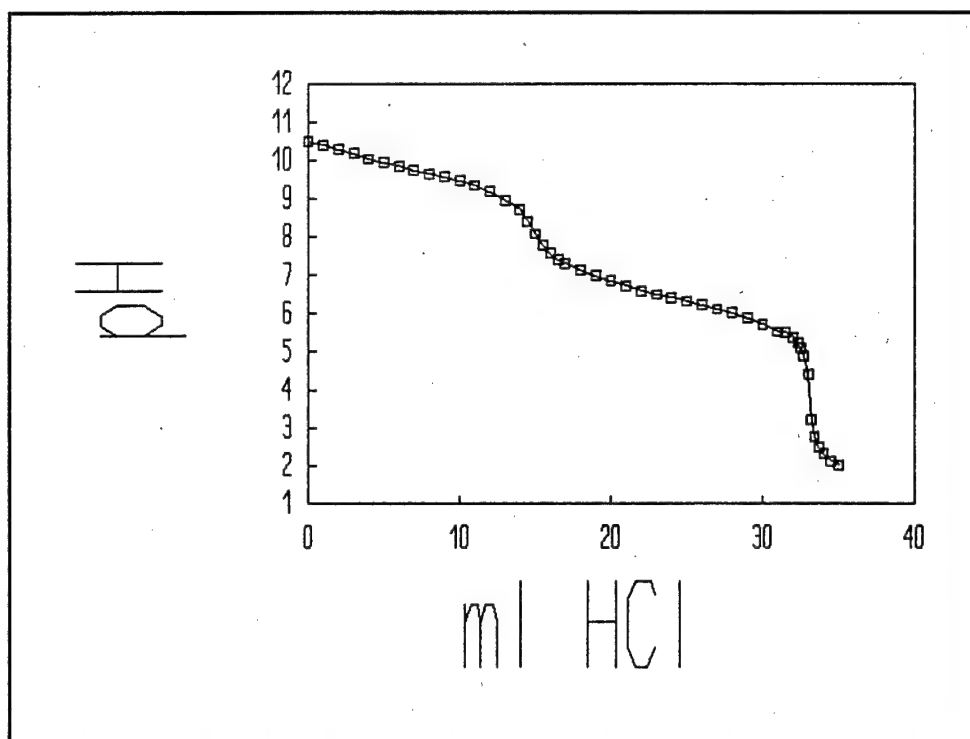


Figure C-166. Curve For The Second Titration Of Spent 250 Micron Sodium Bicarbonate Media With 0.984 M HCl.

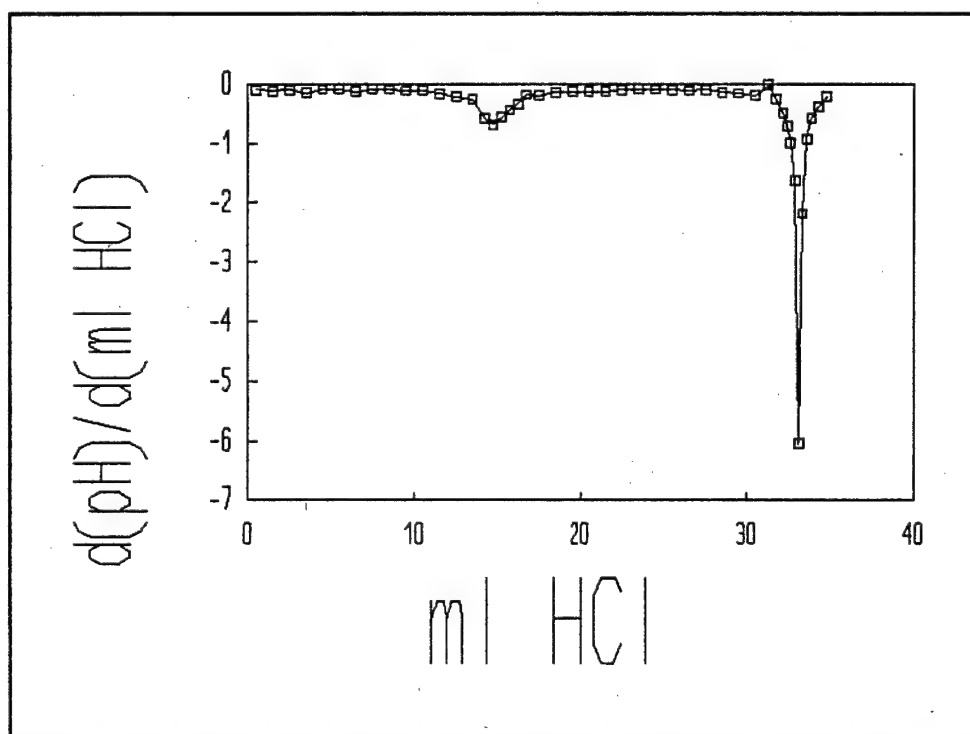


Figure C-167. First Derivative Of The Second Titration Curve For Titration Of Spent 250 Micron Sodium Bicarbonate Media With 0.984 M HCl.

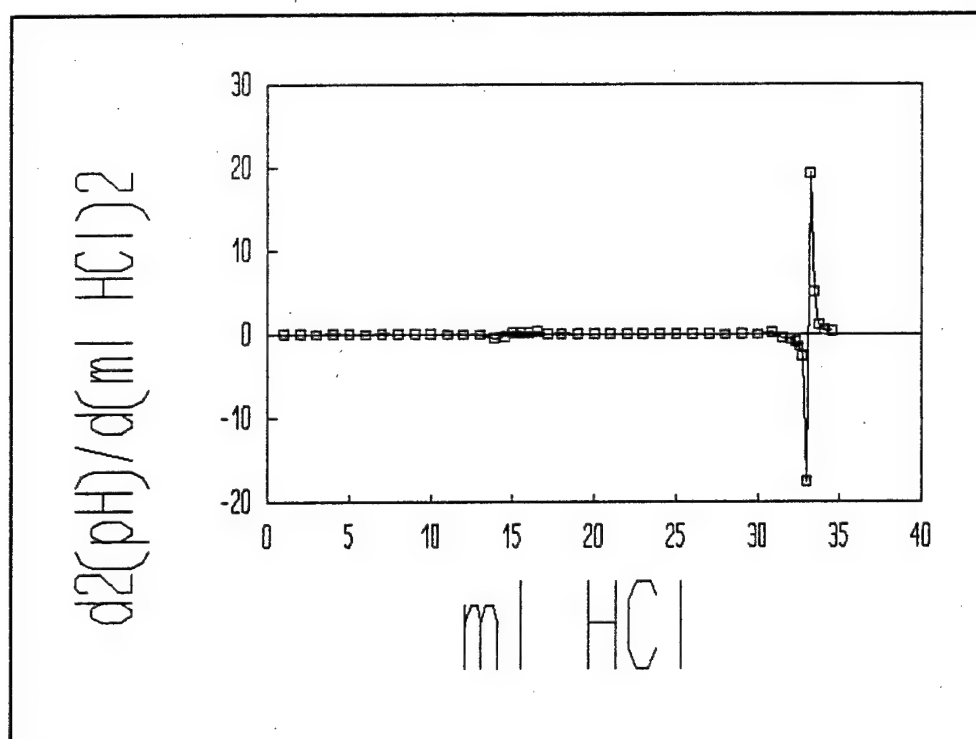


Figure C-168. Second Derivative Of The Second Titration Curve For Titration Of Spent 250 Micron Sodium Bicarbonate Media With 0.984 M HCl.

TABLE 57. SPENT 250 MICRON SODIUM BICARBONATE MEDIA - TITRATION 3.

<u>ml 0.984M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	10.570	0.50	-0.20	1.00	0.11
1.0	10.373	1.50	-0.08	2.00	-0.04
2.0	10.289	2.50	-0.12	3.00	0.03
3.0	10.166	3.50	-0.09	4.00	0.03
4.0	10.075	4.50	-0.06	5.00	-0.03
5.0	10.017	5.50	-0.09	6.00	0.04
6.0	9.928	6.50	-0.05	7.00	-0.06
7.0	9.876	7.50	-0.11	8.00	0.02
8.0	9.764	8.50	-0.09	9.00	0.04
9.0	9.677	9.50	-0.04	10.00	-0.18
10.0	9.633	10.50	-0.23	11.00	0.14
11.0	9.407	11.50	-0.08	12.00	-0.02
12.0	9.324	12.50	-0.11	13.00	0.03
13.0	9.216	13.50	-0.08	14.00	-0.11
14.0	9.137	14.50	-0.19	15.00	-0.03
15.0	8.948	15.50	-0.22	15.88	-0.14
16.0	8.733	16.25	-0.32	16.50	-1.90
16.5	8.572	16.75	-1.27	17.00	1.76
17.0	7.936	17.25	-0.39	17.50	-0.18
17.5	7.741	17.75	-0.48	18.00	0.42
18.0	7.501	18.25	-0.27	18.50	0.06
18.5	7.366	18.75	-0.24	19.13	-0.21
19.0	7.246	19.50	-0.40	20.00	0.24
20.0	6.851	20.50	-0.15	21.00	0.02
21.0	6.699	21.50	-0.13	22.00	0.02
22.0	6.564	22.50	-0.11	23.00	0.02
23.0	6.451	23.50	-0.09	24.00	-0.03
24.0	6.362	24.50	-0.12	25.00	0.03
25.0	6.247	25.50	-0.08	26.00	-0.03
26.0	6.163	26.50	-0.12	27.00	-0.01
27.0	6.045	27.50	-0.12	28.00	-0.01
28.0	5.921	28.50	-0.14	28.88	-0.06
29.0	5.786	29.25	-0.18	29.50	0.19
29.5	5.697	29.75	-0.08	30.00	-0.57
30.0	5.655	30.25	-0.37	30.50	0.19
30.5	5.470	30.75	-0.27	31.13	-2.75
31.0	5.333	31.50	-2.34	31.88	1.54
32.0	2.995	32.25	-1.19	32.50	1.56
32.5	2.402	32.75	-0.41	33.13	0.23
33.0	2.198	33.50	-0.24	34.00	0.11
34.0	1.961	34.50	-0.13	26.00	-0.01
35.0	1.831	17.50	0.05	8.75	0.00

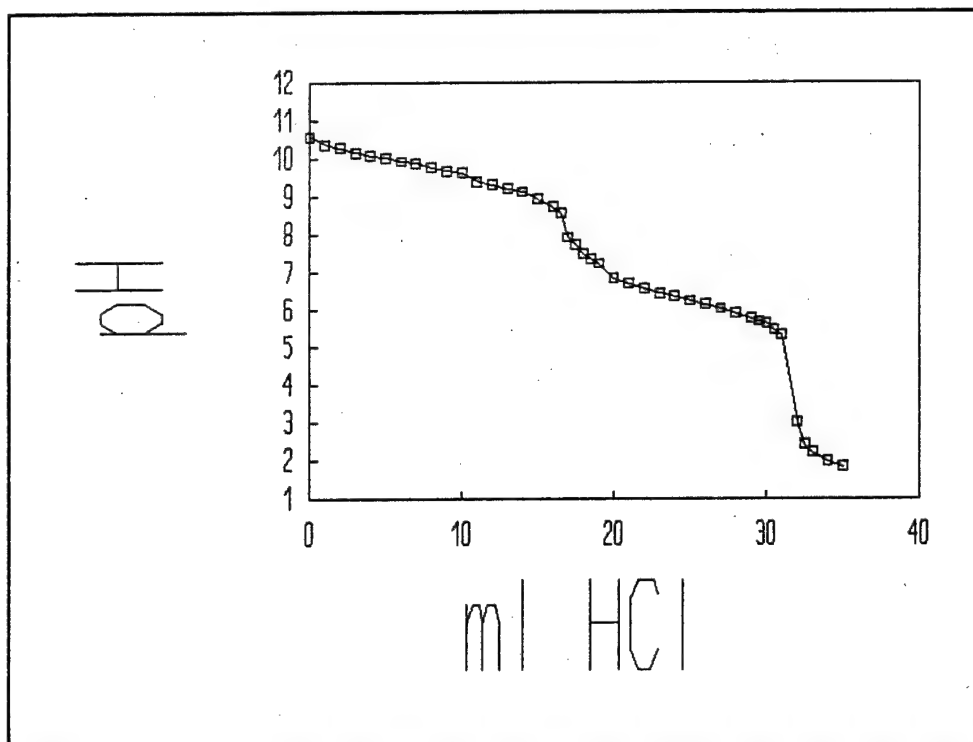


Figure C-169. Curve For The Third Titration Of Spent 250 Micron Sodium Bicarbonate Media With 0.984 M HCl.

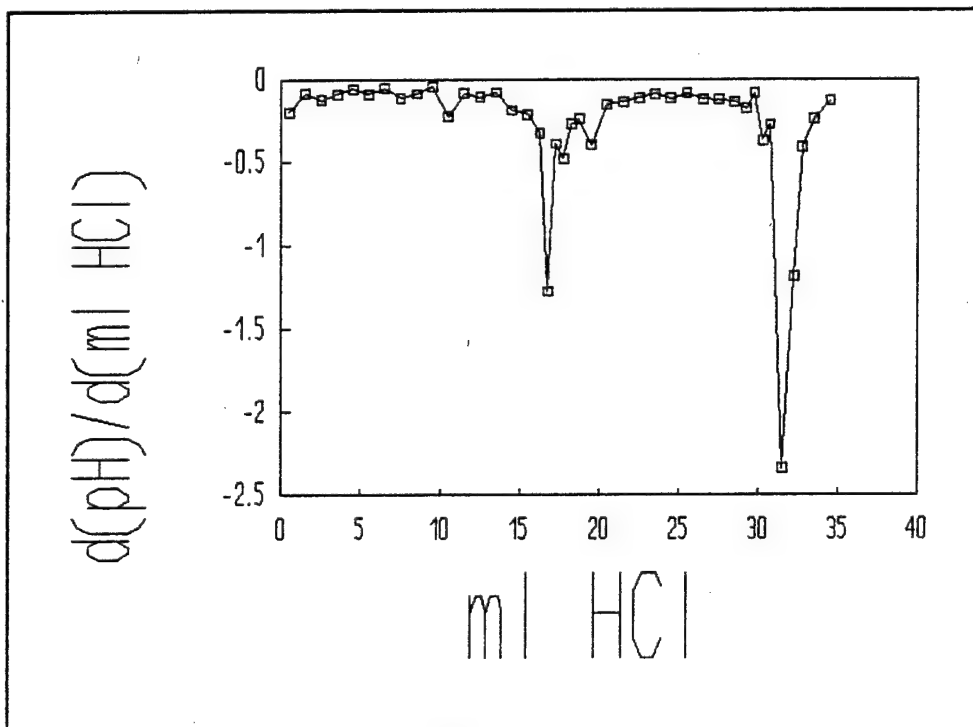


Figure C-170. First Derivative Of The Third Titration Curve For Titration Of Spent 250 Micron Sodium Bicarbonate Media With 0.984 M HCl.

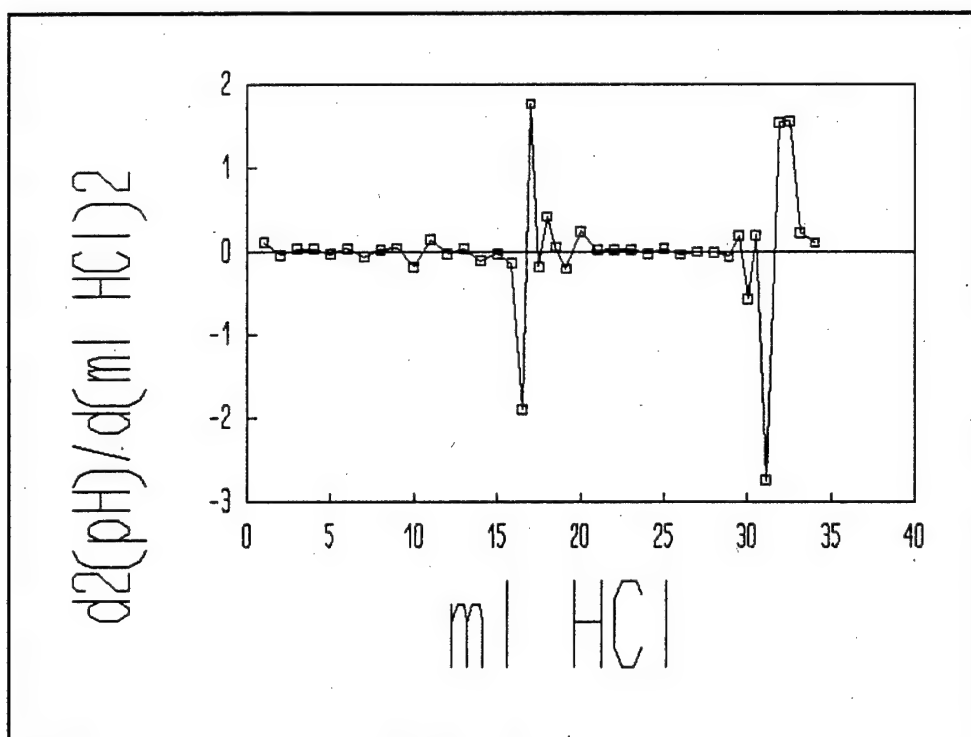


Figure C-171. Second Derivative Of The Third Titration Curve For Titration Of Spent 250 Micron Sodium Bicarbonate Media With 0.984 M HCl .

TABLE 58. SPENT 250 MICRON SODIUM BICARBONATE MEDIA - TITRATION 4.

<u>ml 0.984M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	9.961	0.50	-0.05	1.00	-0.07
1.0	9.914	1.50	-0.12	2.00	-0.02
2.0	9.792	2.50	-0.15	3.00	-0.02
3.0	9.647	3.50	-0.17	4.00	0.22
4.0	9.479	4.50	0.05	5.00	-0.20
5.0	9.534	5.50	-0.14	6.00	0.07
6.0	9.391	6.50	-0.07	7.00	-0.09
7.0	9.317	7.50	-0.16	8.00	-0.09
8.0	9.157	8.50	-0.25	9.00	0.03
9.0	8.903	9.50	-0.22	10.00	-0.28
10.0	8.680	10.50	-0.50	10.88	-0.30
11.0	8.178	11.25	-0.72	11.50	1.38
11.5	7.816	11.75	-0.03	12.00	-1.52
12.0	7.800	12.25	-0.79	12.50	1.07
12.5	7.405	12.75	-0.26	13.13	0.06
13.0	7.277	13.50	-0.21	14.00	0.04
14.0	7.067	14.50	-0.17	15.00	-0.00
15.0	6.894	15.50	-0.18	16.00	0.14
16.0	6.718	16.50	-0.03	17.00	-0.04
17.0	6.684	17.50	-0.07	18.00	0.00
18.0	6.610	18.50	-0.07	19.00	-0.02
19.0	6.540	19.50	-0.09	20.00	0.00
20.0	6.451	20.50	-0.09	21.00	-0.02
21.0	6.363	21.50	-0.10	22.00	0.02
22.0	6.259	22.50	-0.08	23.00	-0.01
23.0	6.176	23.50	-0.09	24.00	0.01
24.0	6.084	24.50	-0.09	25.00	-0.03
25.0	5.998	25.50	-0.12	26.00	0.10
26.0	5.879	26.50	-0.02	27.00	-0.22
27.0	5.859	27.50	-0.24	27.83	1.14
28.0	5.624	28.15	0.51	28.28	-3.35
28.3	5.776	28.40	-0.33	28.53	0.27
28.5	5.710	28.65	-0.26	28.78	-1.81
28.8	5.631	28.90	-0.71	29.03	0.05
29.0	5.488	29.15	-0.70	29.28	-3.07
29.3	5.277	29.40	-1.47	29.50	-6.40
29.5	4.983	29.60	-2.75	29.73	-7.89
29.7	4.433	29.85	-4.72	30.05	8.60
30.0	3.016	30.25	-1.28	30.50	1.57
30.5	2.375	30.75	-0.50	31.13	0.38
31.0	2.126	31.50	-0.22	32.00	0.08
32.0	1.911	32.50	-0.13	33.00	0.04
33.0	1.780	33.50	-0.09	34.00	0.02
34.0	1.688	34.50	-0.07	26.00	-0.01
35.0	1.617	17.50	0.05	8.75	0.00

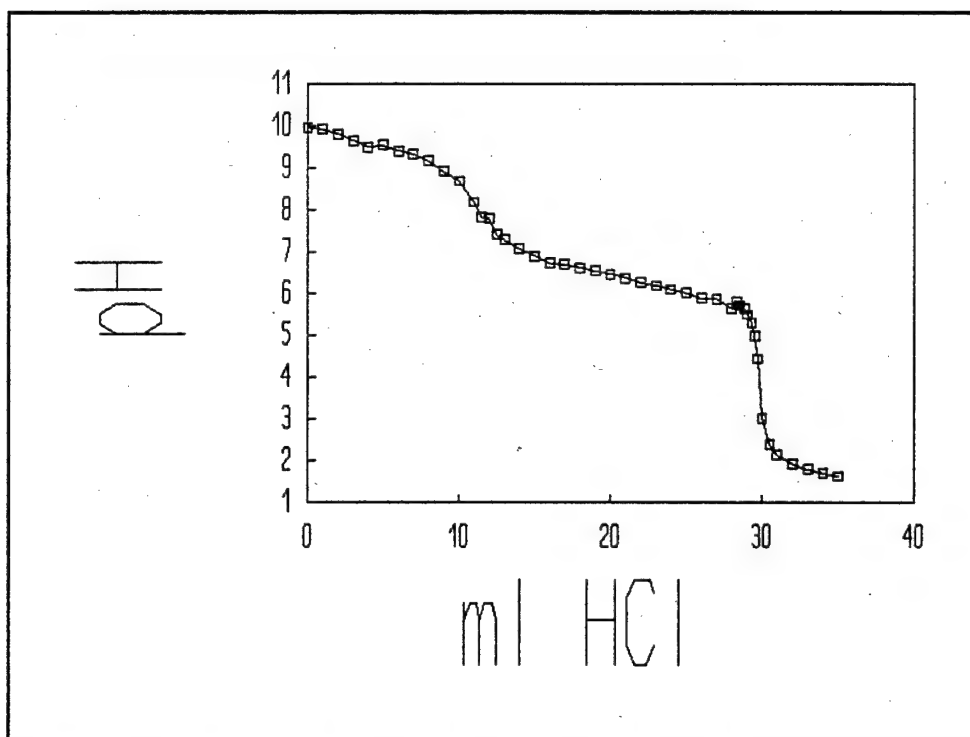


Figure C-172. Curve For The Fourth Titration Of Spent 250 Micron Sodium Bicarbonate Media With 0.984 M HCl.

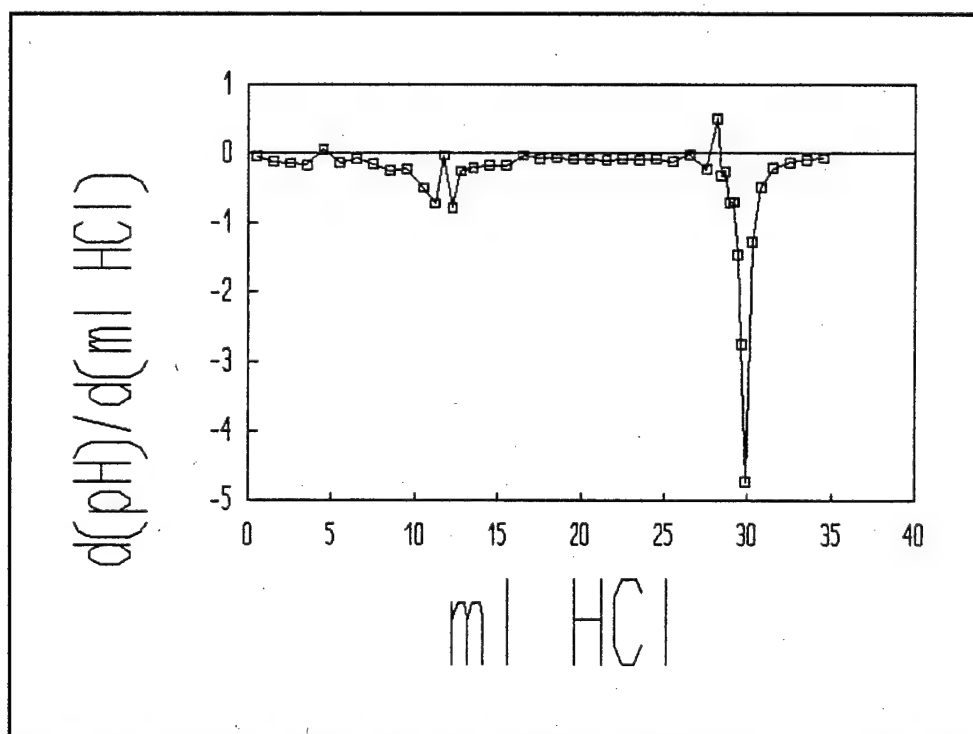


Figure C-173. First Derivative Of The Fourth Titration Curve For Titration Of Spent 250 Micron Sodium Bicarbonate Media With 0.984 M HCl.

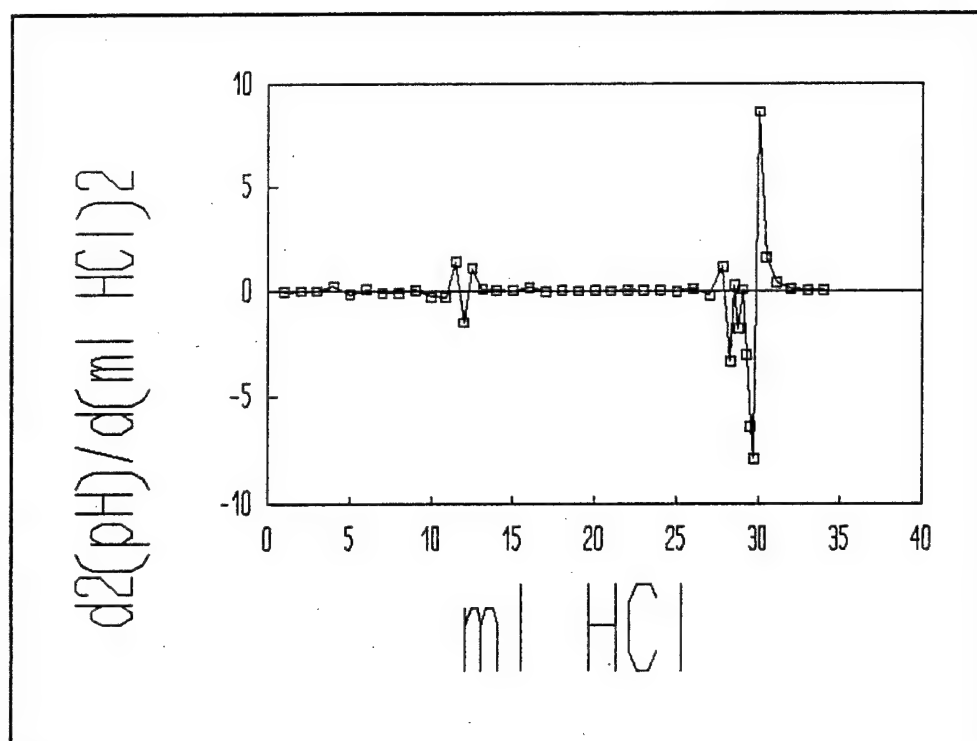


Figure C-174. Second Derivative Of The Fourth Titration Curve For Titration Of Spent 250 Micron Sodium Bicarbonate Media With 0.984 M HCl .

TABLE 59. SPENT 150 MICRON SODIUM BICARBONATE MEDIA - TITRATION 1.

<u>ml 0.984M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	9.192	0.50	-0.14	1.00	-0.09
1.0	9.048	1.50	-0.24	2.00	-0.22
2.0	8.810	2.50	-0.46	2.88	-0.29
3.0	8.349	3.25	-0.68	3.50	0.22
3.5	8.009	3.75	-0.57	4.00	0.19
4.0	7.725	4.25	-0.47	4.50	0.26
4.5	7.489	4.75	-0.34	5.00	0.15
5.0	7.317	5.25	-0.27	5.50	0.14
5.5	7.182	5.75	-0.20	6.13	0.04
6.0	7.083	6.50	-0.17	7.00	0.04
7.0	6.916	7.50	-0.12	8.00	0.06
8.0	6.793	8.50	-0.07	9.00	-0.02
9.0	6.727	9.50	-0.09	10.00	0.02
10.0	6.638	10.50	-0.07	11.00	0.07
11.0	6.566	11.50	-0.00	12.00	-0.07
12.0	6.563	12.50	-0.07	13.00	-0.01
13.0	6.494	13.50	-0.08	14.00	0.02
14.0	6.411	14.50	-0.06	15.00	-0.01
15.0	6.348	15.50	-0.08	16.00	0.00
16.0	6.270	16.50	-0.07	17.00	-0.02
17.0	6.195	17.50	-0.09	18.00	-0.01
18.0	6.105	18.50	-0.10	19.00	0.09
19.0	6.004	19.50	-0.01	20.00	-0.13
20.0	5.998	20.50	-0.13	21.00	-0.08
21.0	5.865	21.50	-0.22	21.88	-0.07
22.0	5.647	22.25	-0.27	22.43	-0.01
22.5	5.513	22.60	-0.27	22.73	-0.80
22.7	5.459	22.85	-0.47	23.00	-0.49
23.0	5.318	23.15	-0.62	23.28	-1.55
23.3	5.133	23.40	-1.00	23.53	-12.82
23.5	4.932	23.65	-4.21	23.78	-2.72
23.8	3.669	23.90	-4.89	24.20	7.17
24.0	2.691	24.50	-0.59	25.00	0.38
25.0	2.102	25.50	-0.21	26.00	0.09
26.0	1.889	26.50	-0.12	27.00	0.04
27.0	1.768	27.50	-0.08	28.00	0.01
28.0	1.687	28.50	-0.07	29.00	0.01
29.0	1.620	29.50	-0.06	22.25	-0.01
30.0	1.564	15.00	0.05	7.50	0.00

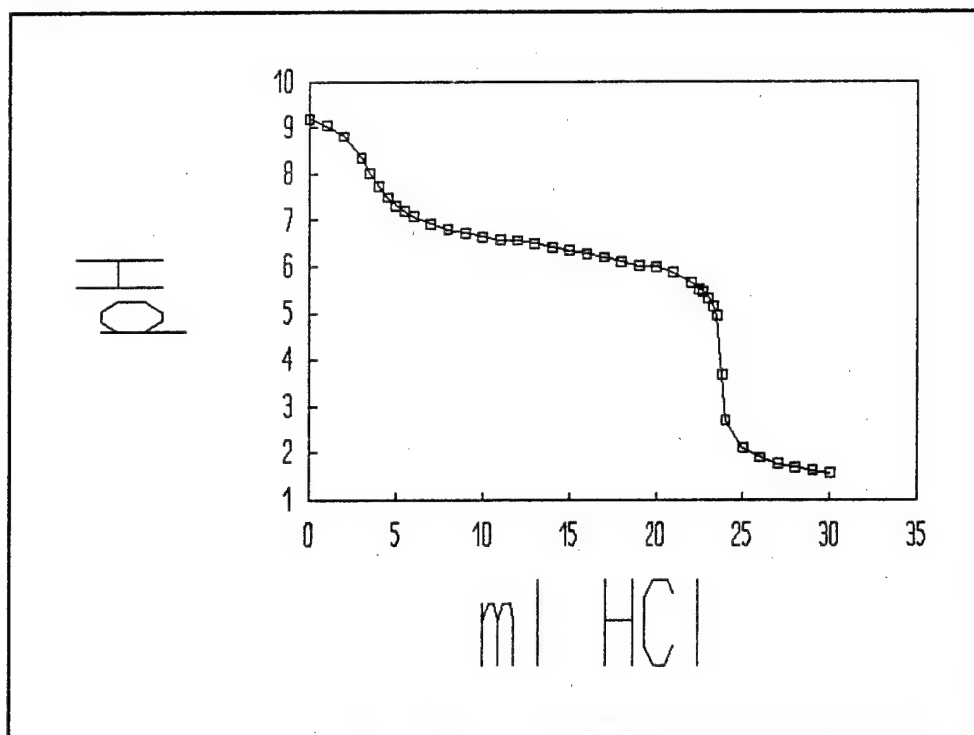


Figure C-175. Curve For The First Titration Of Spent 150 Micron Sodium Bicarbonate Media With 0.984 M HCl.

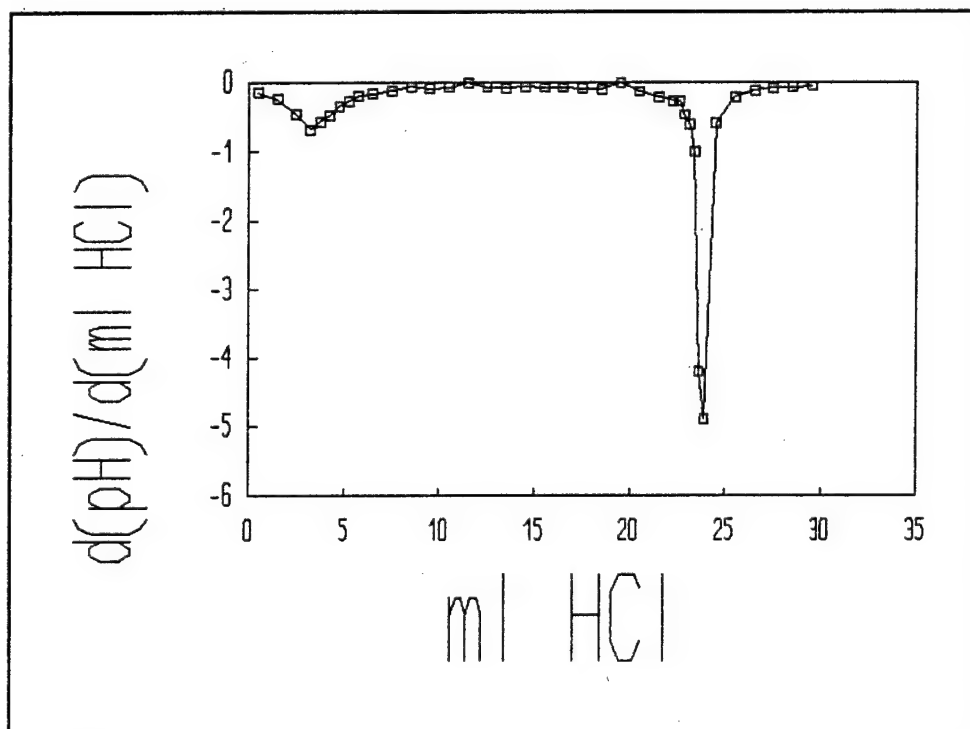


Figure C-176. First Derivative Of The First Titration Curve For Titration Of Spent 150 Micron Sodium Bicarbonate Media With 0.984 M HCl.

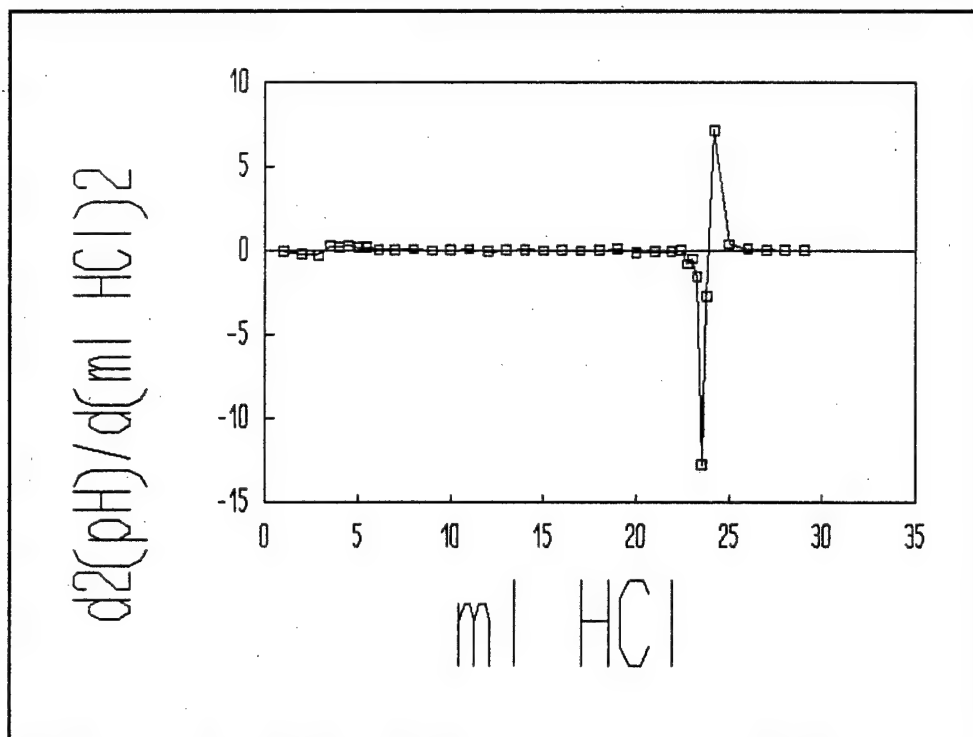


Figure C-177. Second Derivative Of The First Titration Curve For Titration Of Spent 150 Micron Sodium Bicarbonate Media With 0.984 M HCl.

TABLE 59. SPENT 150 MICRON SODIUM BICARBONATE MEDIA - TITRATION 2.

<u>ml 0.984M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	9.536	0.50	-0.32	1.00	0.02
1.0	9.217	1.50	-0.30	2.00	-0.02
2.0	8.916	2.50	-0.33	3.00	-0.27
3.0	8.590	3.50	-0.59	4.00	0.18
4.0	7.996	4.50	-0.42	4.88	0.15
5.0	7.577	5.25	-0.30	5.50	0.04
5.5	7.425	5.75	-0.28	6.13	0.12
6.0	7.284	6.50	-0.19	7.00	0.05
7.0	7.095	7.50	-0.13	8.00	0.04
8.0	6.960	8.50	-0.10	9.00	-0.01
9.0	6.864	9.50	-0.11	10.00	0.01
10.0	6.759	10.50	-0.10	11.00	0.07
11.0	6.663	11.50	-0.03	12.25	-0.04
12.0	6.637	13.00	-0.08	13.75	0.01
14.0	6.468	14.50	-0.07	15.00	-0.00
15.0	6.394	15.50	-0.07	16.00	0.02
16.0	6.319	16.50	-0.05	17.00	-0.01
17.0	6.267	17.50	-0.07	18.00	-0.03
18.0	6.200	18.50	-0.10	19.00	0.09
19.0	6.102	19.50	-0.01	20.00	-0.11
20.0	6.096	20.50	-0.12	21.00	-0.04
21.0	5.976	21.50	-0.16	22.00	-0.02
22.0	5.813	22.50	-0.18	23.00	-0.24
23.0	5.630	23.50	-0.42	23.83	-0.72
24.0	5.211	24.15	-0.89	24.28	-4.07
24.3	4.945	24.40	-1.90	24.50	-27.50
24.5	4.564	24.60	-7.40	24.73	24.50
24.7	3.083	24.85	-1.28	25.18	1.04
25.0	2.699	25.50	-0.60	26.00	0.40
26.0	2.098	26.50	-0.20	27.00	0.08
27.0	1.899	27.50	-0.12	28.00	0.04
28.0	1.779	28.50	-0.08	29.00	0.02
29.0	1.695	29.50	-0.06	22.25	-0.01
30.0	1.631	15.00	0.05	7.50	0.00

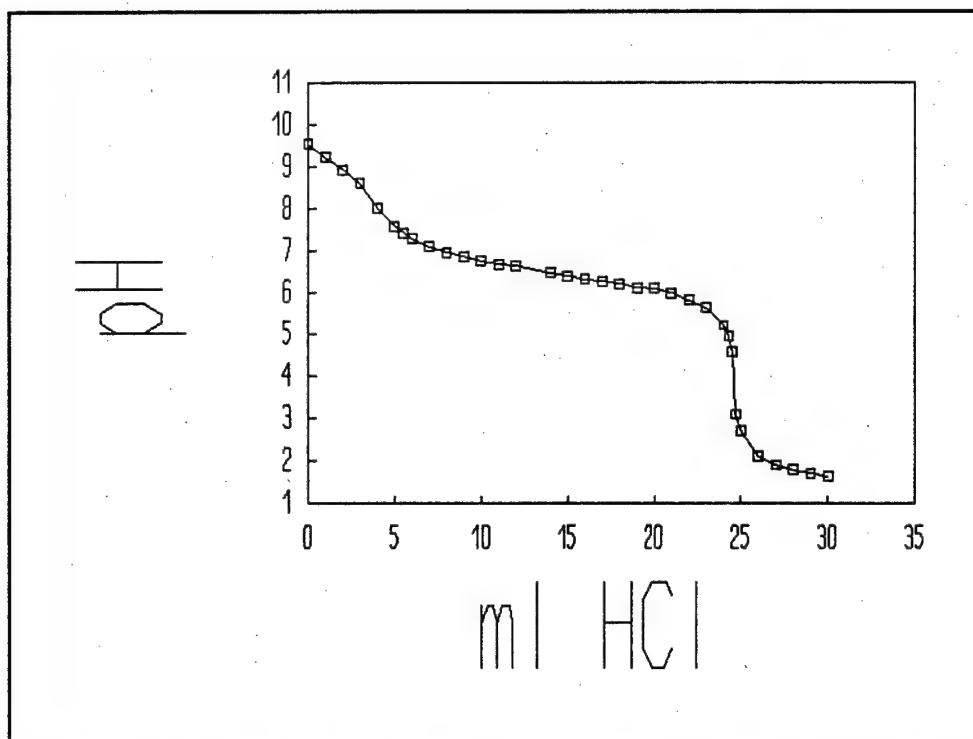


Figure C-178. Curve For The Second Titration Of Spent 150 Micron Sodium Bicarbonate Media With 0.984 M HCl.

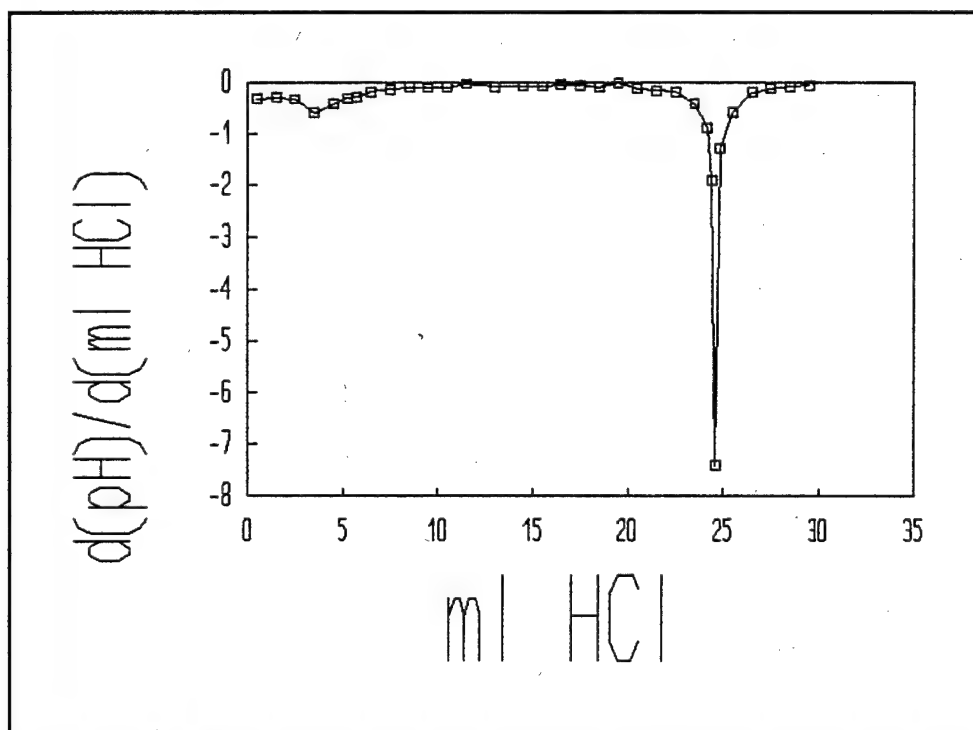


Figure C-179. First Derivative Of The Second Titration Curve For Titration Of Spent 150 Micron Sodium Bicarbonate Media With 0.984 M HCl.

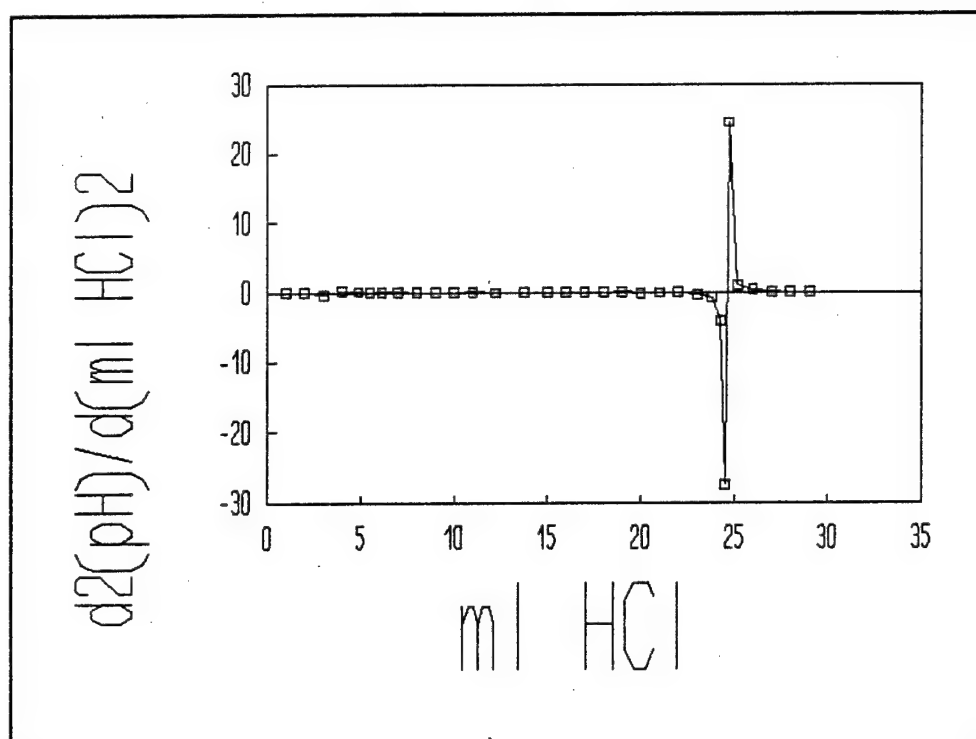


Figure C-180. Second Derivative Of The Second Titration Curve For Titration Of Spent 150 Micron Sodium Bicarbonate Media With 0.984 M HCl.

TABLE 60. SPENT 150 MICRON SODIUM BICARBONATE MEDIA - TITRATION 3.

<u>ml 0.984M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	9.586	0.50	-0.04	1.00	0.00
1.0	9.549	1.50	-0.04	2.00	-0.07
2.0	9.513	2.50	-0.11	3.00	0.07
3.0	9.408	3.50	-0.04	4.00	-0.14
4.0	9.371	4.50	-0.17	5.00	0.06
5.0	9.197	5.50	-0.11	6.00	-0.02
6.0	9.086	6.50	-0.13	7.00	-1.66
7.0	8.954	7.50	-1.79	8.00	1.63
8.0	7.165	8.50	-0.16	9.00	0.03
9.0	7.009	9.50	-0.13	10.00	0.01
10.0	6.879	10.50	-0.12	11.00	0.01
11.0	6.764	11.50	-0.11	12.25	0.02
12.0	6.656	13.00	-0.08	14.00	0.00
14.0	6.488	15.00	-0.08	16.00	-0.01
16.0	6.324	17.00	-0.10	18.00	-0.00
18.0	6.132	19.00	-0.10	19.75	0.06
20.0	5.934	20.50	-0.01	21.00	-0.16
21.0	5.920	21.50	-0.17	21.88	0.08
22.0	5.749	22.25	-0.11	22.45	-0.22
22.5	5.694	22.65	-0.20	22.78	0.33
22.8	5.635	22.90	-0.11	23.08	-0.40
23.0	5.612	23.25	-0.26	23.50	-0.39
23.5	5.484	23.75	-0.45	23.93	-0.31
24.0	5.259	24.10	-0.56	24.20	-0.85
24.2	5.147	24.30	-0.73	24.40	-6.25
24.4	5.001	24.50	-1.98	24.60	-3.43
24.6	4.605	24.70	-2.67	24.80	-11.37
24.8	4.072	24.90	-4.94	25.08	10.32
25.0	3.084	25.25	-1.33	25.50	1.78
25.5	2.420	25.75	-0.44	26.13	0.25
26.0	2.200	26.50	-0.25	27.00	0.13
27.0	1.951	27.50	-0.12	28.00	0.02
28.0	1.834	28.50	-0.10	29.00	0.03
29.0	1.738	29.50	-0.07	22.25	-0.01
30.0	1.671	15.00	0.06	7.50	0.00

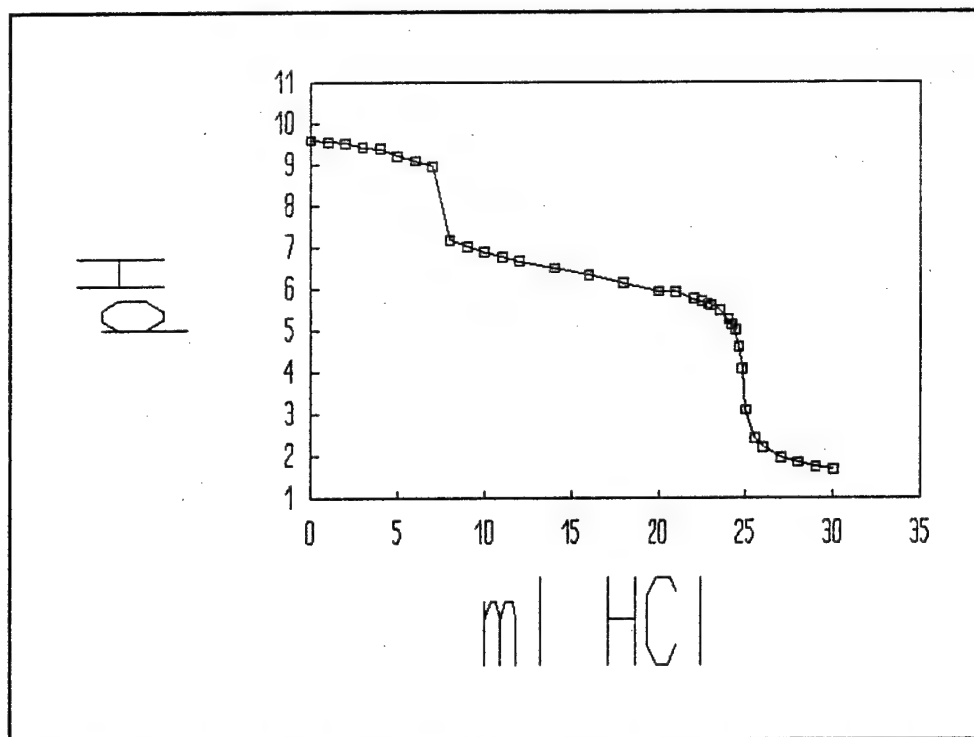


Figure C-181. Curve For The Third Titration Of Spent 150 Micron Sodium Bicarbonate Media With 0.984 M HCl.

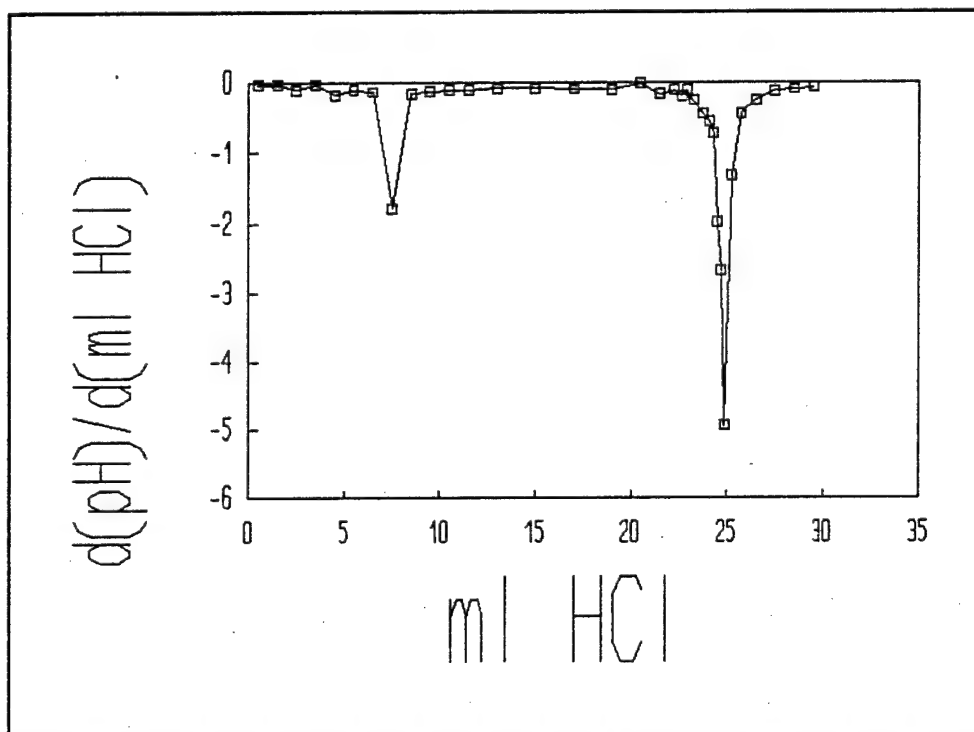


Figure C-182. First Derivative Of The Third Titration Curve For Titration Of Spent 150 Micron Sodium Bicarbonate Media With 0.984 M HCl.

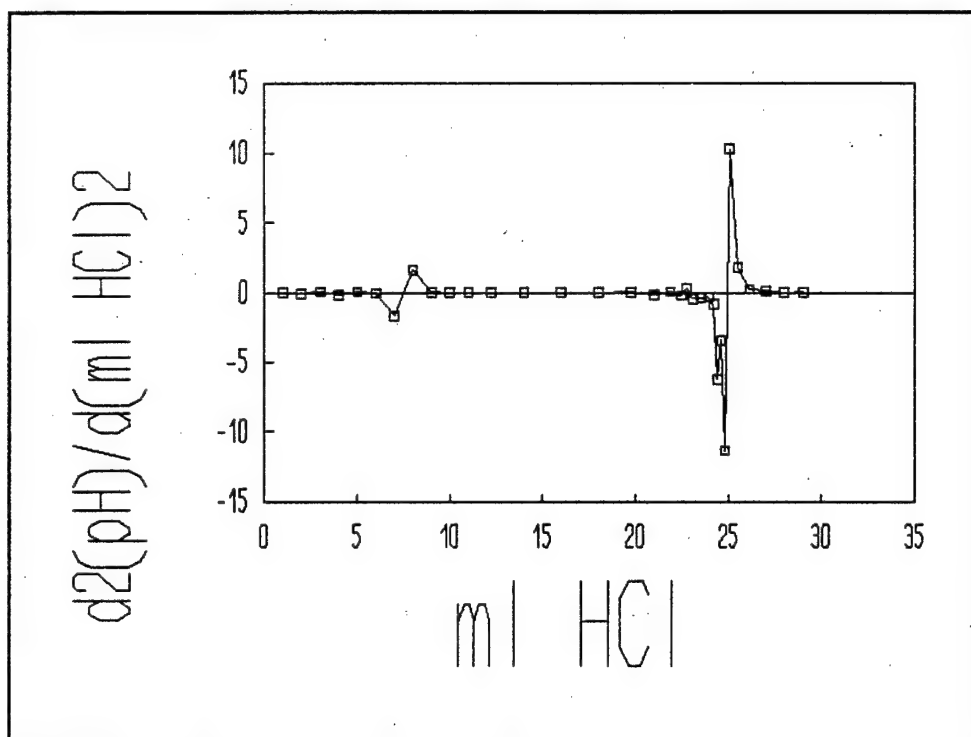


Figure C-183. Second Derivative Of The Third Titration Curve For Titration Of Spent 150 Micron Sodium Bicarbonate Media With 0.984 M HCl.

TABLE 61. SPENT 150 MICRON SODIUM BICARBONATE MEDIA - TITRATION 4.

<u>ml 0.984M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d²(pH)/d(ml)²</u>
0.0	9.575	0.50	-0.13	1.00	-0.04
1.0	9.449	1.50	-0.16	2.00	0.03
2.0	9.285	2.50	-0.14	3.00	-0.22
3.0	9.147	3.50	-0.36	3.88	0.26
4.0	8.791	4.25	-0.16	4.50	-0.23
4.5	8.711	4.75	-0.27	5.00	-0.48
5.0	8.574	5.25	-0.51	5.50	0.08
5.5	8.317	5.75	-0.47	6.00	0.32
6.0	8.081	6.25	-0.31	6.50	-0.78
6.5	7.925	6.75	-0.70	7.00	0.91
7.0	7.574	7.25	-0.25	7.50	-0.27
7.5	7.451	7.75	-0.38	8.13	0.26
8.0	7.260	8.50	-0.19	9.00	0.03
9.0	7.072	9.50	-0.16	10.25	0.03
10.0	6.916	11.00	-0.12	12.00	0.02
12.0	6.679	13.00	-0.08	14.00	-0.00
14.0	6.511	15.00	-0.08	16.00	0.00
16.0	6.342	17.00	-0.08	18.00	0.01
18.0	6.183	19.00	-0.06	20.00	-0.03
20.0	6.064	21.00	-0.13	19.25	-0.04
22.0	5.806	17.50	0.02	17.88	-0.03
23.0	5.651	18.25	-0.01	21.00	-0.04
23.5	5.592	23.75	-0.24	24.00	-0.20
24.0	5.472	24.25	-0.34	24.50	-0.42
24.5	5.303	24.75	-0.55	24.93	-1.16
25.0	5.028	25.10	-0.95	25.20	-9.40
25.2	4.837	25.30	-2.84	25.40	-19.07
25.4	4.270	25.50	-6.65	25.60	28.42
25.6	2.940	25.70	-0.97	25.80	-3.35
25.8	2.747	25.90	-1.63	26.20	2.09
26.0	2.420	26.50	-0.38	27.00	0.21
27.0	2.037	27.50	-0.18	28.00	0.07
28.0	1.860	28.50	-0.10	29.00	0.01
29.0	1.756	29.50	-0.09	22.25	-0.01
30.0	1.664	15.00	0.06	7.50	0.00

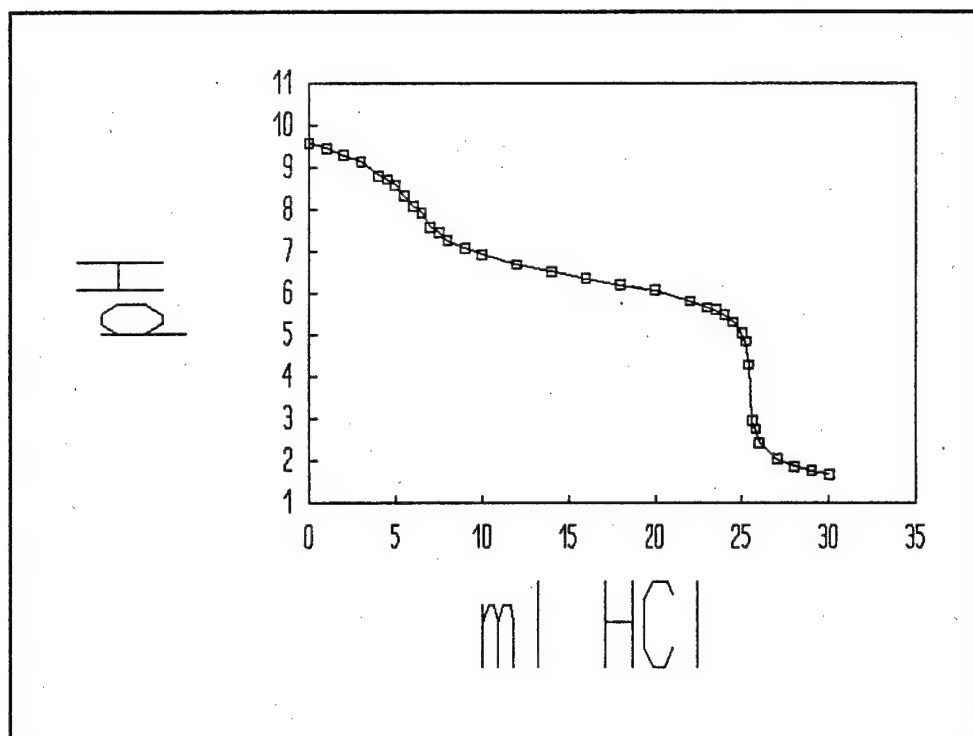


Figure C-184. Curve For The Fourth Titration Of Spent 150 Micron Sodium Bicarbonate Media With 0.984 M HCl.

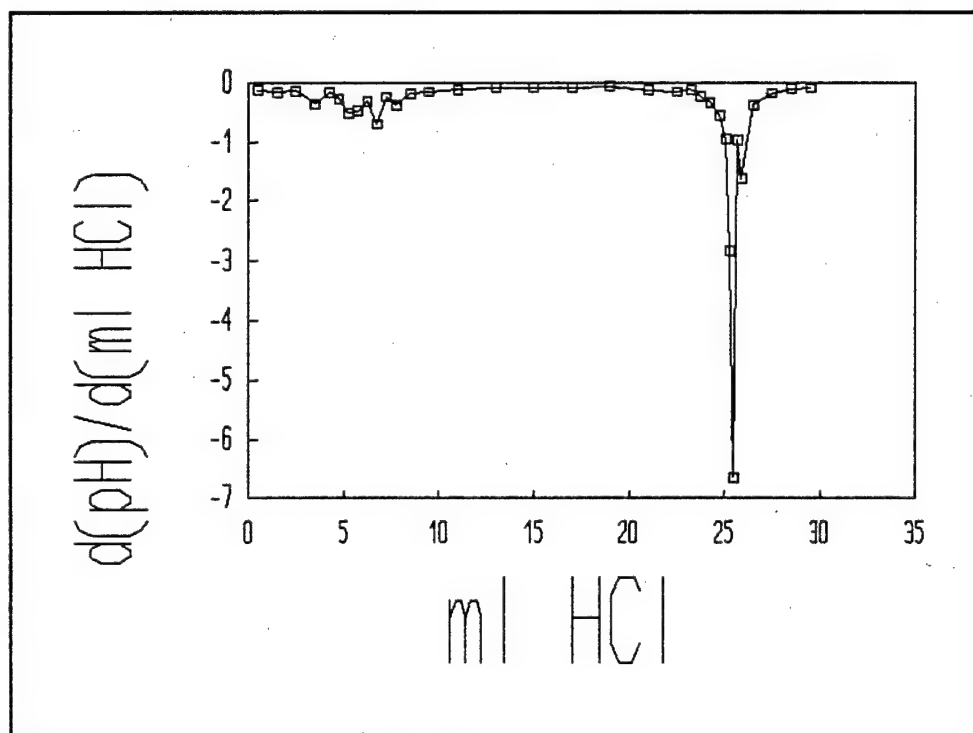


Figure C-185. First Derivative Of The Fourth Titration Curve For Titration Of Spent 150 Micron Sodium Bicarbonate Media With 0.984 M HCl.

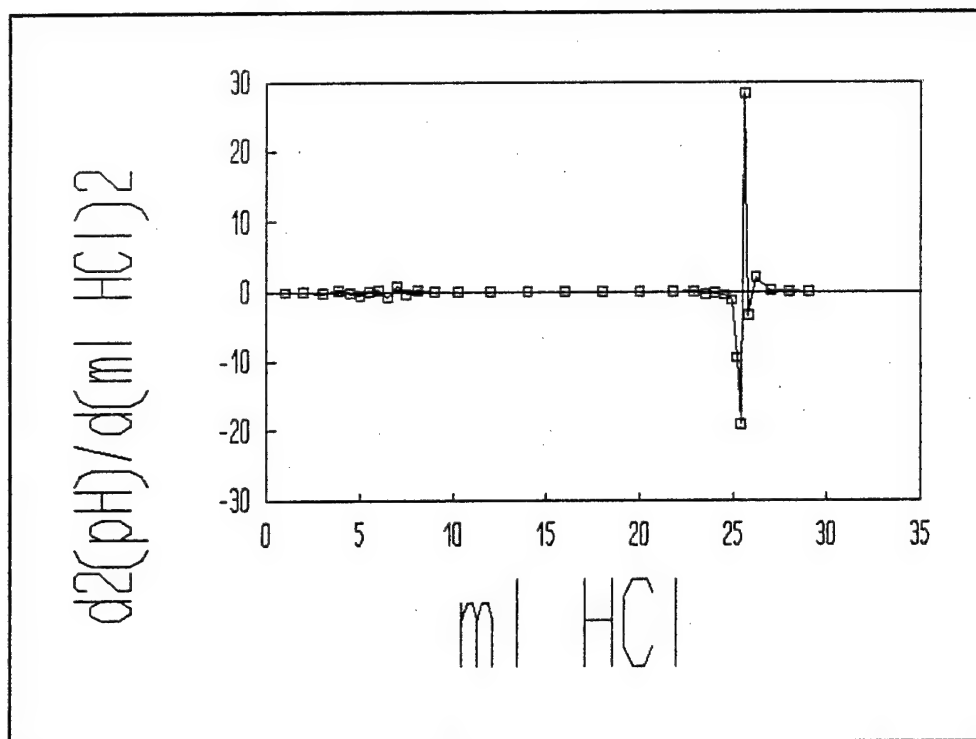


Figure C-186. Second Derivative Of The Fourth Titration Curve For Titration Of Spent 150 Micron Sodium Bicarbonate Media With 0.984 M HCl.

TABLE 62. SPENT 106 MICRON SODIUM BICARBONATE MEDIA - TITRATION 1.

<u>ml 0.981M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	9.646	0.50	-0.09	1.00	-0.09
1.0	9.553	1.50	-0.18	2.00	-0.00
2.0	9.370	2.50	-0.19	3.00	-0.02
3.0	9.184	3.50	-0.21	3.88	-0.10
4.0	8.974	4.25	-0.28	4.50	-0.10
4.5	8.833	4.75	-0.33	5.00	0.21
5.0	8.668	5.25	-0.23	5.50	-0.92
5.5	8.555	5.75	-0.69	6.00	-0.58
6.0	8.212	6.25	-0.97	6.50	1.24
6.5	7.725	6.75	-0.35	7.00	0.06
7.0	7.548	7.25	-0.33	7.50	-0.02
7.5	7.385	7.75	-0.33	8.13	0.17
8.0	7.218	8.50	-0.21	9.25	0.06
9.0	7.009	10.00	-0.12	11.00	0.01
11.0	6.763	12.00	-0.10	13.00	0.01
13.0	6.565	14.00	-0.09	15.00	0.01
15.0	6.393	16.00	-0.06	17.00	-0.02
17.0	6.272	18.00	-0.09	19.00	0.01
19.0	6.088	20.00	-0.08	20.75	-0.00
21.0	5.932	21.50	-0.08	22.00	-0.01
22.0	5.852	22.50	-0.09	22.88	-0.01
23.0	5.767	23.25	-0.09	23.50	-0.08
23.5	5.720	23.75	-0.13	24.00	-0.02
24.0	5.654	24.25	-0.14	24.50	-0.27
24.5	5.584	24.75	-0.27	25.00	-0.16
25.0	5.447	25.25	-0.35	25.43	-0.04
25.5	5.271	25.60	-0.36	25.73	-0.43
25.7	5.198	25.85	-0.47	25.98	-2.85
26.0	5.056	26.10	-1.18	26.20	-2.50
26.2	4.819	26.30	-1.69	26.40	-21.70
26.4	4.482	26.50	-6.02	26.60	18.20
26.6	3.277	26.70	-2.39	26.80	5.68
26.8	2.800	26.90	-1.25	27.08	1.90
27.0	2.550	27.25	-0.59	27.50	0.48
27.5	2.257	27.75	-0.34	28.13	0.21
28.0	2.085	28.50	-0.19	29.00	0.07
29.0	1.899	29.50	-0.12	22.25	-0.01
30.0	1.779	15.00	0.06	7.50	0.00

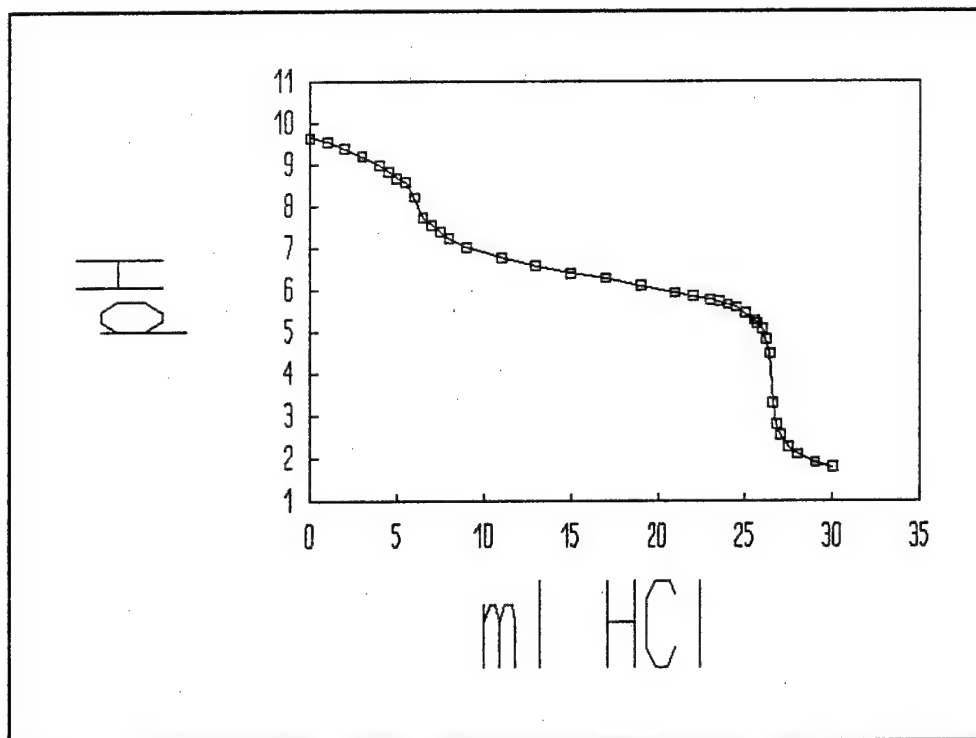


Figure C-187. Curve For The First Titration Of Spent 106 Micron Sodium Bicarbonate Media With 0.981 M HCl.

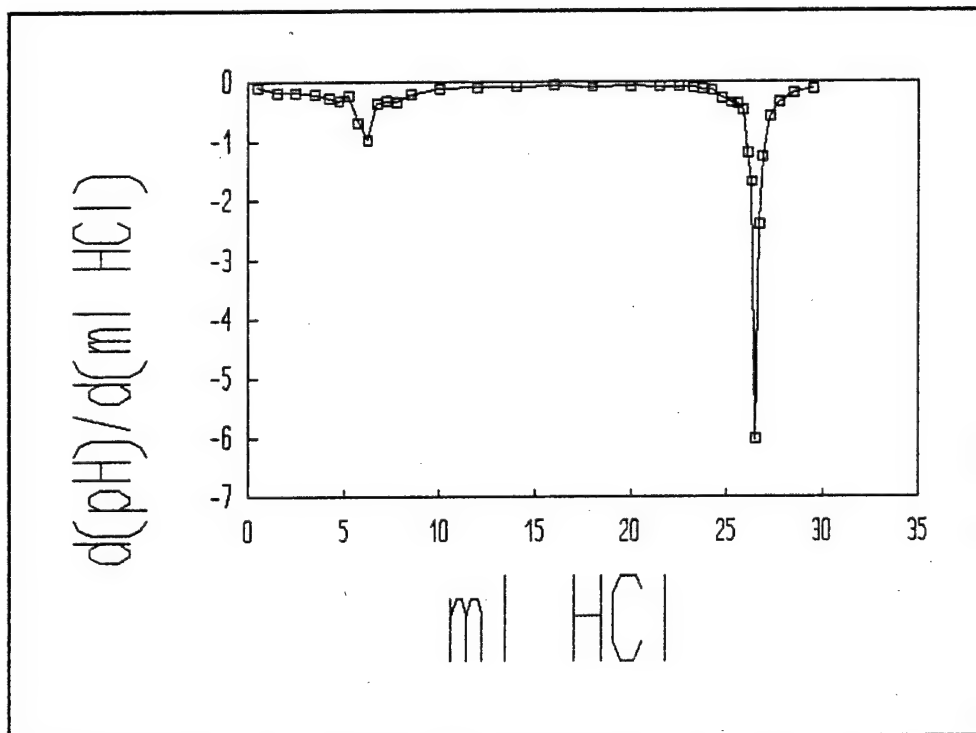


Figure C-188. First Derivative Of The First Titration Curve For Titration Of Spent 106 Micron Sodium Bicarbonate Media With 0.981 M HCl.

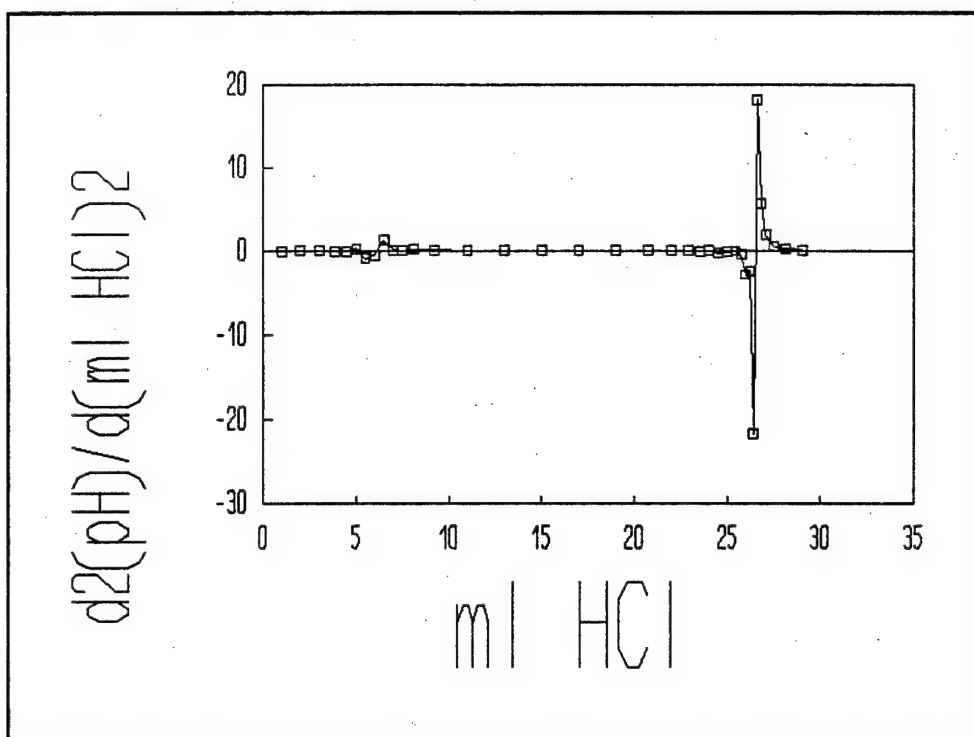


Figure C-189. Second Derivative Of The First Titration Curve For Titration Of Spent 106 Micron Sodium Bicarbonate Media With 0.981 M HCl.

TABLE 63. SPENT 106 MICRON SODIUM BICARBONATE MEDIA - TITRATION 2.

<u>ml 0.981M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	9.695	0.50	-0.09	1.00	-0.04
1.0	9.607	1.50	-0.13	2.00	-0.00
2.0	9.474	2.50	-0.13	3.00	-0.04
3.0	9.340	3.50	-0.17	4.00	-0.01
4.0	9.166	4.50	-0.19	5.00	-0.13
5.0	8.978	5.50	-0.32	5.88	-0.17
6.0	8.661	6.25	-0.45	6.50	-0.96
6.5	8.437	6.75	-0.93	7.00	0.74
7.0	7.973	7.25	-0.56	7.50	0.30
7.5	7.693	7.75	-0.41	8.13	0.11
8.0	7.487	8.50	-0.33	9.00	0.14
9.0	7.160	9.50	-0.19	10.25	0.04
10.0	6.974	11.00	-0.13	12.00	0.02
12.0	6.707	13.00	-0.09	14.00	0.01
14.0	6.533	15.00	-0.08	16.00	-0.00
16.0	6.382	17.00	-0.08	18.00	0.00
18.0	6.230	19.00	-0.07	20.00	0.02
20.0	6.086	21.00	-0.03	21.75	-0.05
22.0	6.032	22.50	-0.11	23.00	-0.01
23.0	5.925	23.50	-0.12	24.00	-0.06
24.0	5.806	24.50	-0.18	25.00	-0.02
25.0	5.625	25.50	-0.20	26.00	-0.40
26.0	5.429	26.50	-0.59	26.88	-3.73
27.0	4.837	27.25	-3.39	27.43	2.88
27.5	3.141	27.60	-2.38	27.73	4.06
27.7	2.664	27.85	-1.37	28.05	2.63
28.0	2.253	28.25	-0.32	28.50	-0.03
28.5	2.094	28.75	-0.33	29.00	0.30
29.0	1.927	29.25	-0.19	29.50	-0.06
29.5	1.834	29.75	-0.22	22.38	-0.02
30.0	1.726	15.00	0.06	7.50	0.00

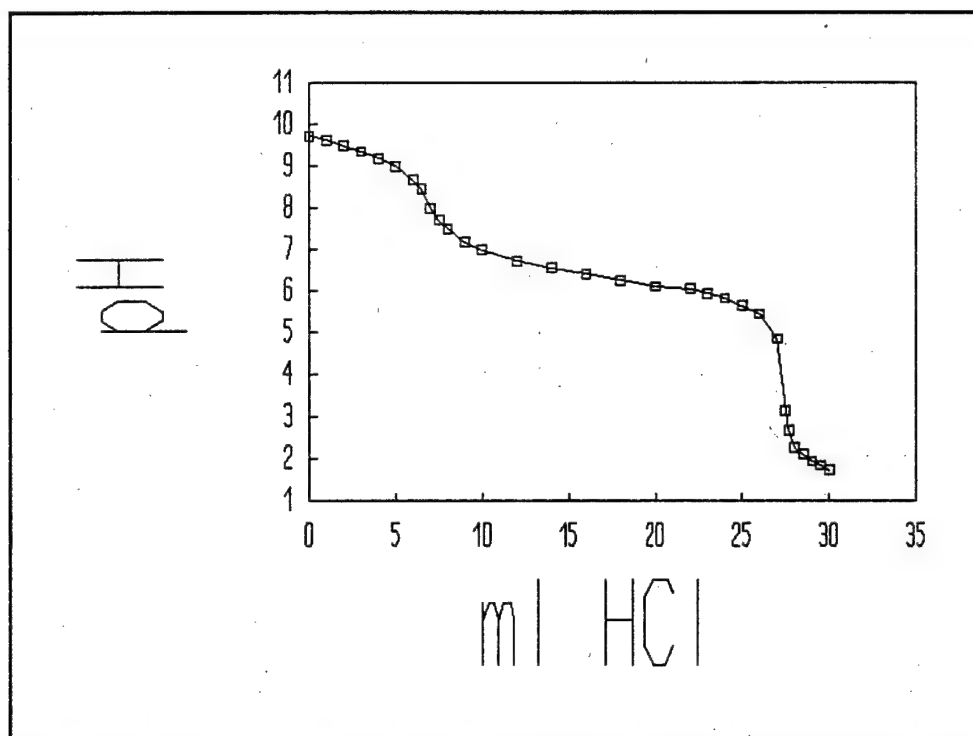


Figure C-190. Curve For The Second Titration Of Spent 106 Micron Sodium Bicarbonate Media With 0.981 M HCl.

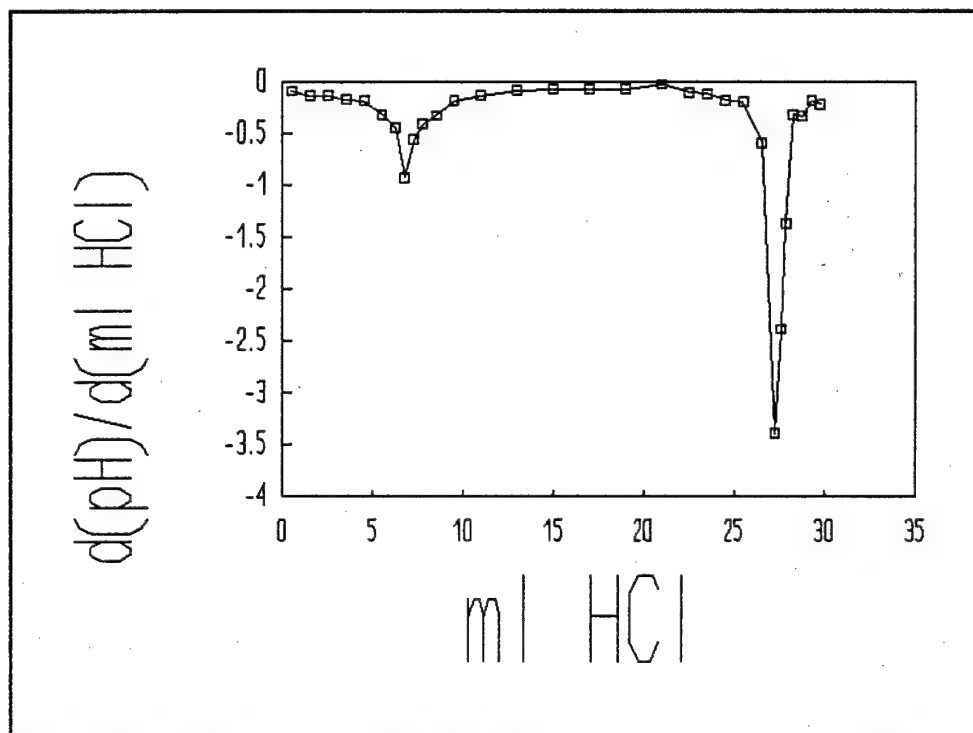


Figure C-191. First Derivative Of The Second Titration Curve For Titration Of Spent 106 Micron Sodium Bicarbonate Media With 0.981 M HCl.

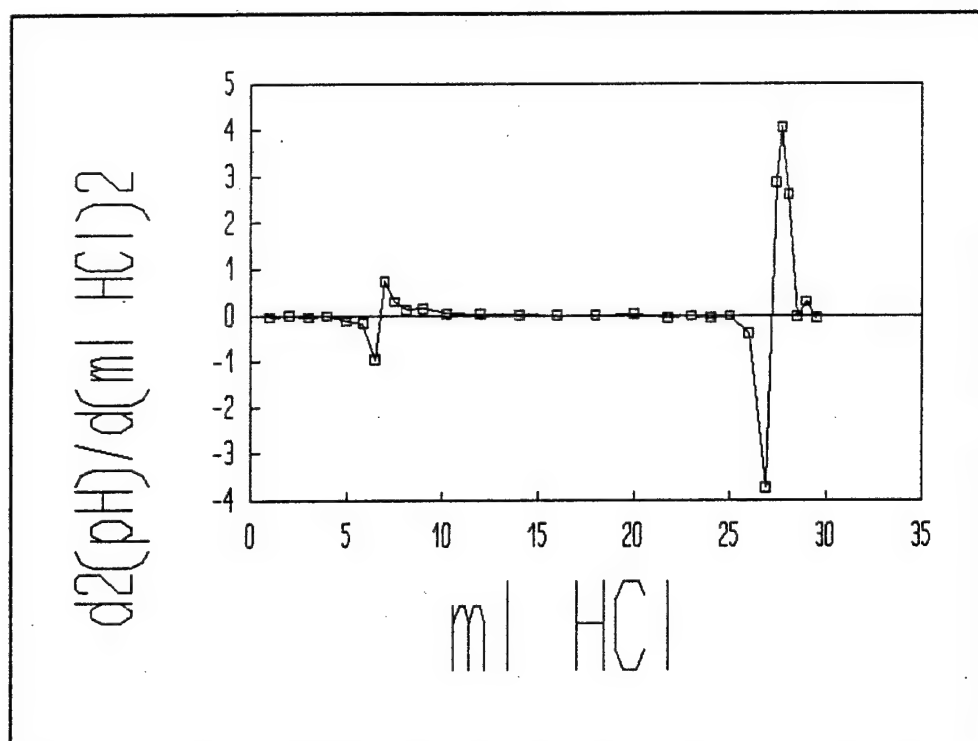


Figure C-192. Second Derivative Of The Second Titration Curve For Titration Of Spent 106 Micron Sodium Bicarbonate Media With 0.981 M HCl.

TABLE 64. SPENT 106 MICRON SODIUM BICARBONATE MEDIA - TITRATION 3.

<u>ml 0.981M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	9.755	0.50	0.03	1.00	-0.24
1.0	9.783	1.50	-0.21	2.00	0.04
2.0	9.572	2.50	-0.17	3.00	0.01
3.0	9.402	3.50	-0.16	4.00	-0.07
4.0	9.241	4.50	-0.23	5.00	-0.19
5.0	9.008	5.50	-0.43	5.88	-0.53
6.0	8.581	6.25	-0.82	6.50	-0.30
6.5	8.170	6.75	-0.97	7.00	0.94
7.0	7.685	7.25	-0.50	7.50	0.19
7.5	7.435	7.75	-0.41	8.38	0.16
8.0	7.232	9.00	-0.21	10.00	0.04
10.0	6.810	11.00	-0.14	12.00	0.02
12.0	6.532	13.00	-0.10	14.00	0.00
14.0	6.329	15.00	-0.10	16.00	-0.00
16.0	6.139	17.00	-0.10	18.00	-0.02
18.0	5.938	19.00	-0.14	19.75	-0.02
20.0	5.661	20.50	-0.16	20.88	-0.06
21.0	5.497	21.25	-0.21	21.50	-0.41
21.5	5.393	21.75	-0.41	21.93	-0.11
22.0	5.187	22.10	-0.45	22.20	-2.08
22.2	5.092	22.30	-0.87	22.40	-4.55
22.4	4.924	22.50	-1.77	22.58	-4.90
22.6	4.569	22.65	-2.51	22.70	10.50
22.7	4.318	22.75	-1.46	22.80	-45.40
22.8	4.172	22.85	-6.00	22.90	11.70
22.9	3.572	22.95	-4.83	23.10	10.98
23.0	3.089	23.25	-1.54	23.50	2.22
23.5	2.321	23.75	-0.42	24.13	0.25
24.0	2.109	24.50	-0.23	25.00	0.11
25.0	1.876	25.50	-0.12	26.25	0.03
26.0	1.755	27.00	-0.08	28.00	0.02
28.0	1.593	29.00	-0.04	22.00	-0.01
30.0	1.504	15.00	0.05	7.50	0.00

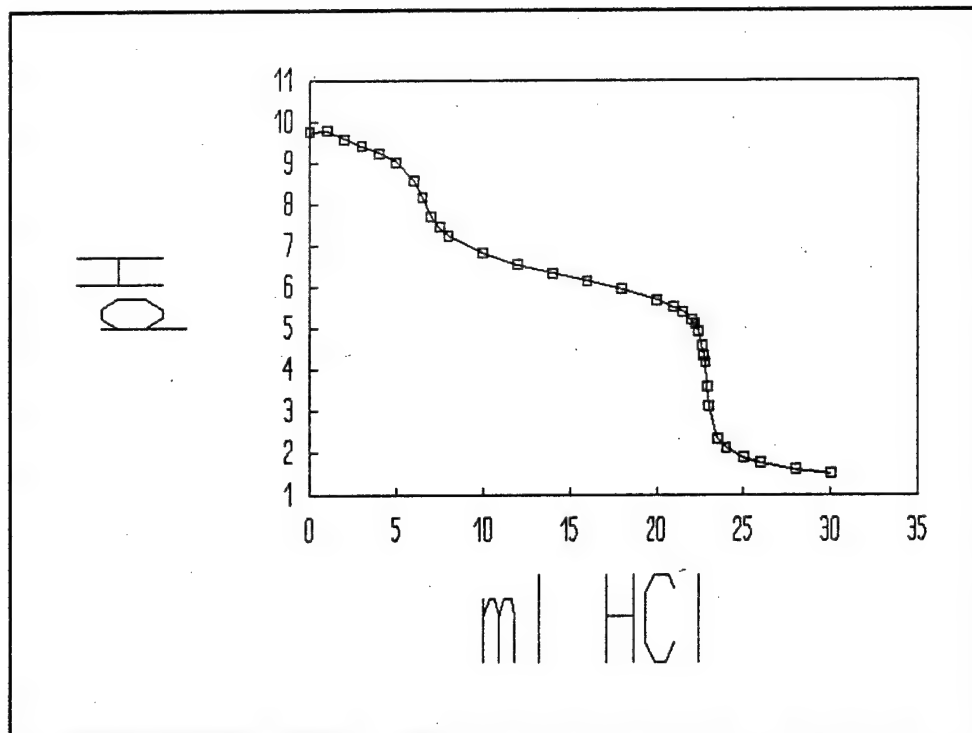


Figure C-193. Curve For The Third Titration Of Spent 106 Micron Sodium Bicarbonate Media With 0.981 M HCl.

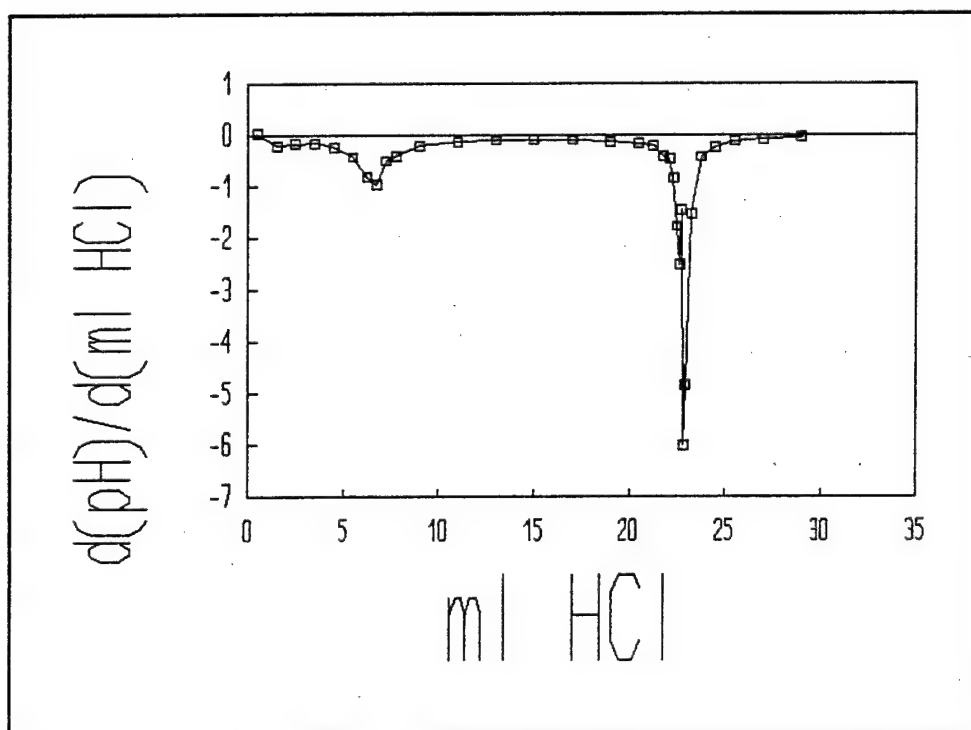


Figure C-194. First Derivative Of The Third Titration Curve For Titration Of Spent 106 Micron Sodium Bicarbonate Media With 0.981 M HCl.

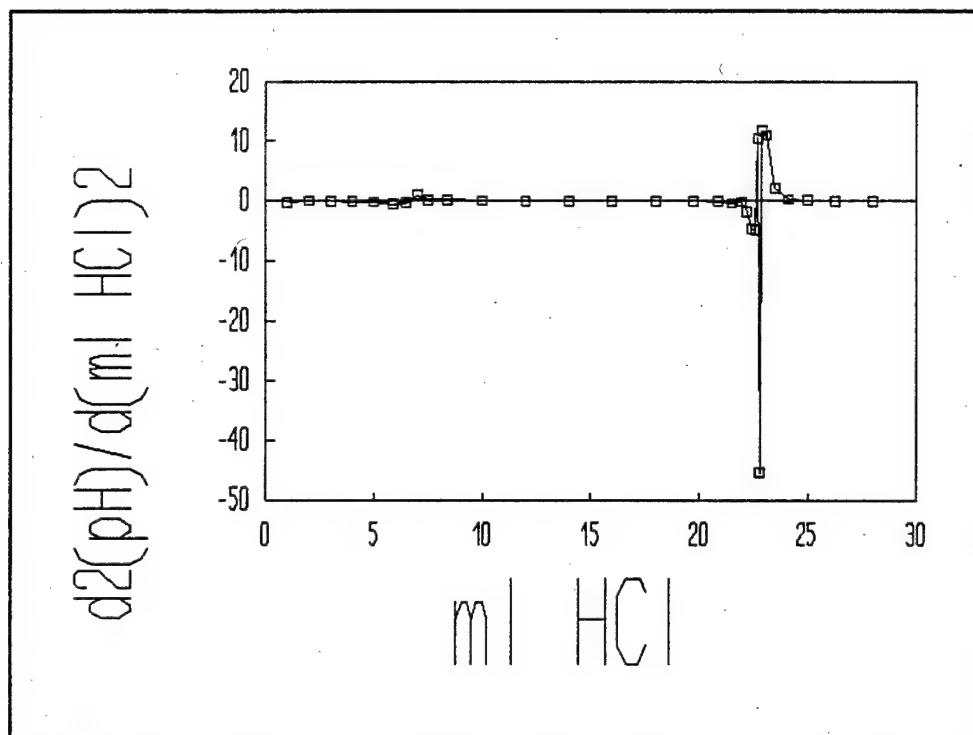


Figure C-195. Second Derivative Of The Third Titration Curve For Titration Of Spent 106 Micron Sodium Bicarbonate Media With 0.981 M HCl.

TABLE 65. SPENT 106 MICRON SODIUM BICARBONATE MEDIA - TITRATION 4.

<u>ml 0.981M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	10.033	0.50	-0.14	1.00	0.01
1.0	9.896	1.50	-0.13	2.00	0.02
2.0	9.765	2.50	-0.11	3.00	-0.02
3.0	9.653	3.50	-0.13	4.00	-0.01
4.0	9.520	4.50	-0.15	5.00	-0.02
5.0	9.375	5.50	-0.17	6.00	-0.05
6.0	9.209	6.50	-0.21	7.00	-0.09
7.0	8.996	7.50	-0.30	7.88	-0.42
8.0	8.698	8.25	-0.61	8.50	-0.28
8.5	8.392	8.75	-0.75	9.00	0.20
9.0	8.016	9.25	-0.65	9.50	0.32
9.5	7.689	9.75	-0.49	10.13	0.35
10.0	7.443	10.50	-0.23	11.25	0.03
11.0	7.211	12.00	-0.18	13.00	0.03
13.0	6.844	14.00	-0.12	15.00	0.03
15.0	6.607	16.00	-0.06	17.00	-0.02
17.0	6.488	18.00	-0.09	19.00	0.00
19.0	6.304	20.00	-0.09	20.75	0.05
21.0	6.121	21.50	-0.01	22.00	-0.07
22.0	6.108	22.50	-0.09	23.00	0.01
23.0	6.022	23.50	-0.07	24.00	-0.08
24.0	5.948	24.50	-0.15	24.88	0.10
25.0	5.796	25.25	-0.08	25.50	-0.18
25.5	5.756	25.75	-0.17	26.00	-0.13
26.0	5.672	26.25	-0.23	26.50	-0.37
26.5	5.556	26.75	-0.42	27.00	0.30
27.0	5.347	27.25	-0.27	27.45	-3.50
27.5	5.214	27.65	-1.67	27.78	-25.43
27.8	4.714	27.90	-8.02	28.08	19.33
28.0	3.109	28.25	-1.26	28.50	1.33
28.5	2.479	28.75	-0.60	29.00	0.59
29.0	2.181	29.25	-0.30	29.50	0.21
29.5	2.030	29.75	-0.20	22.38	-0.02
30.0	1.932	15.00	0.06	7.50	0.00

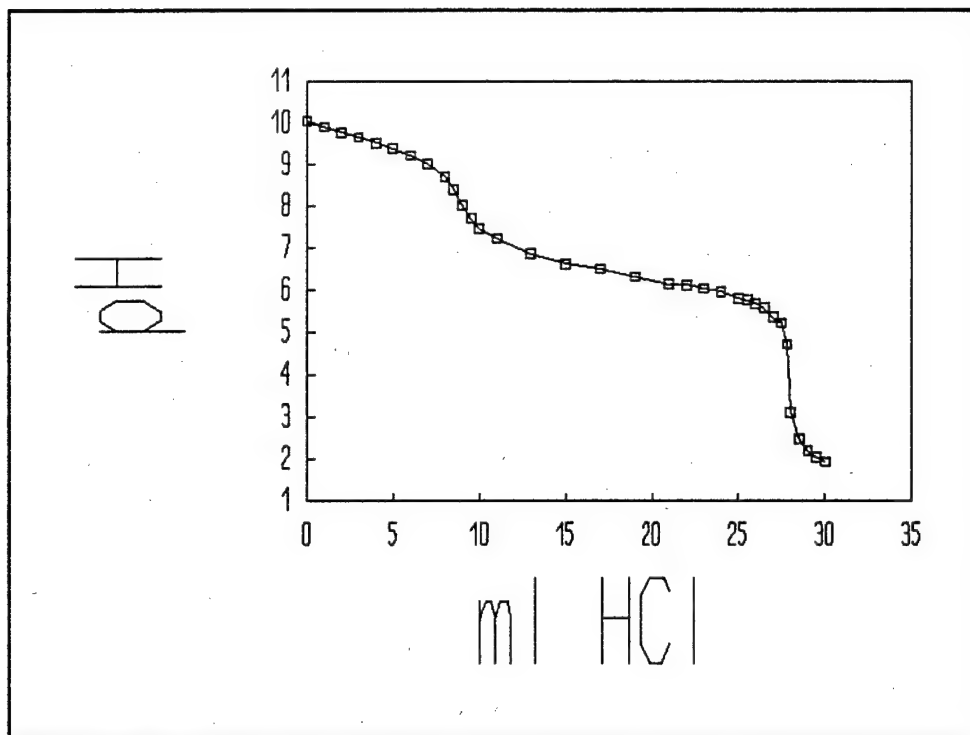


Figure C-196. Curve For The Fourth Titration Of Spent 106 Micron Sodium Bicarbonate Media With 0.981 M HCl.

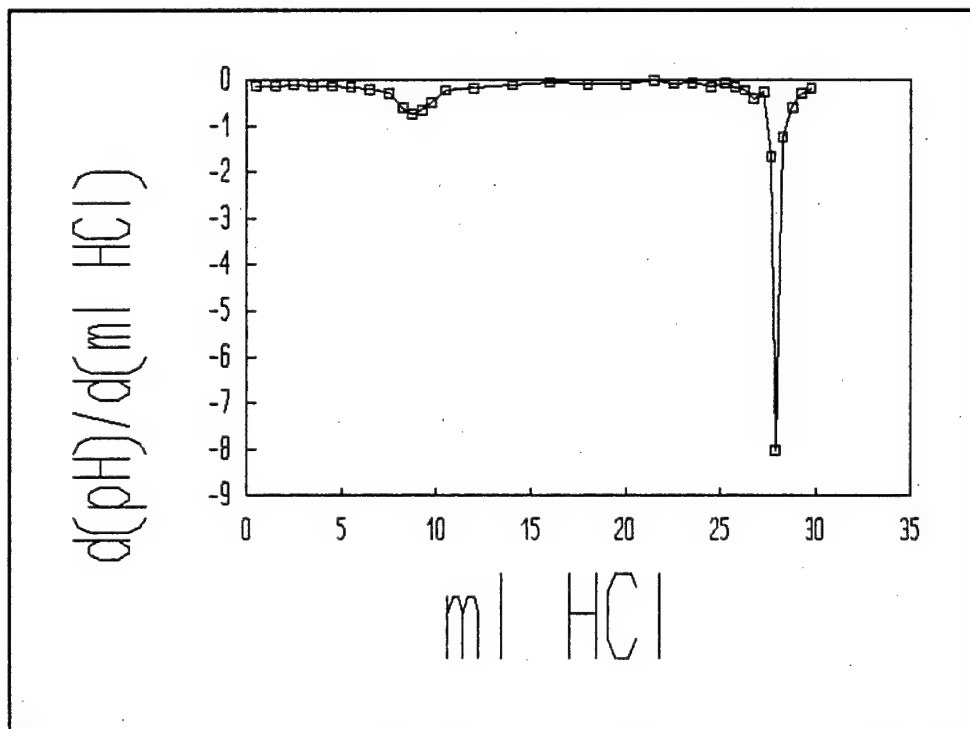


Figure C-197. First Derivative Of The Fourth Titration Curve For Titration Of Spent 106 Micron Sodium Bicarbonate Media With 0.981 M HCl.

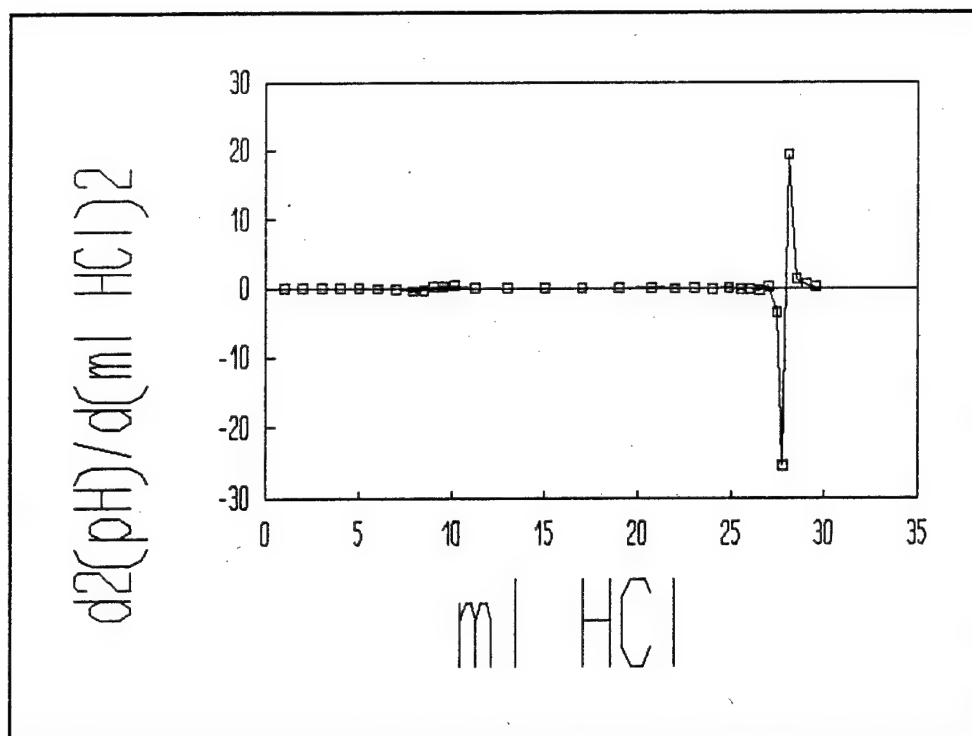


Figure C-198. Second Derivative Of The Fourth Titration Curve For Titration Of Spent 106 Micron Sodium Bicarbonate Media With 0.981 M HCl.

TABLE 66. SPENT 75 MICRON SODIUM BICARBONATE MEDIA - TITRATION 1.

ml 0.981M HCl	pH	Vol (ml)	d(pH)/d(ml)	Vol (ml)	d ² (pH)/d(ml) ²
0.0	10.411	0.50	-0.14	1.00	-0.01
1.0	10.271	1.50	-0.15	2.00	0.06
2.0	10.120	2.50	-0.09	3.25	-0.01
3.0	10.027	4.00	-0.11	5.00	0.00
5.0	9.799	6.00	-0.11	7.00	0.00
7.0	9.578	8.00	-0.11	9.00	-0.03
9.0	9.357	10.00	-0.17	11.00	-0.13
11.0	9.017	12.00	-0.42	12.63	-0.30
13.0	8.169	13.25	-0.80	13.50	0.63
13.5	7.770	13.75	-0.48	14.00	0.16
14.0	7.529	14.25	-0.40	14.50	0.41
14.5	7.327	14.75	-0.20	15.38	-0.00
15.0	7.227	16.00	-0.20	17.00	0.03
17.0	6.818	18.00	-0.13	18.75	0.03
19.0	6.548	19.50	-0.09	20.00	-0.02
20.0	6.460	20.50	-0.11	21.00	0.03
21.0	6.354	21.50	-0.08	22.00	-0.00
22.0	6.273	22.50	-0.09	23.00	-0.01
23.0	6.188	23.50	-0.10	24.00	0.00
24.0	6.088	24.50	-0.10	25.00	-0.00
25.0	5.991	25.50	-0.10	25.88	0.03
26.0	5.892	26.25	-0.08	26.50	-0.17
26.5	5.854	26.75	-0.16	27.00	0.01
27.0	5.773	27.25	-0.16	27.50	-0.08
27.5	5.694	27.75	-0.20	28.00	-0.04
28.0	5.595	28.25	-0.22	28.45	-0.47
28.5	5.486	28.65	-0.41	28.78	0.45
28.8	5.364	28.90	-0.30	29.03	-1.55
29.0	5.305	29.15	-0.68	29.28	-1.69
29.3	5.100	29.40	-1.10	29.50	-7.32
29.5	4.879	29.60	-2.57	29.73	-10.64
29.7	4.365	29.85	-5.23	30.05	10.81
30.0	2.796	30.25	-0.91	30.50	0.84
30.5	2.342	30.75	-0.49	31.38	0.25
31.0	2.097	32.00	-0.17	33.00	0.05
33.0	1.752	34.00	-0.08	25.75	-0.01
35.0	1.588	17.50	0.05	8.75	0.00

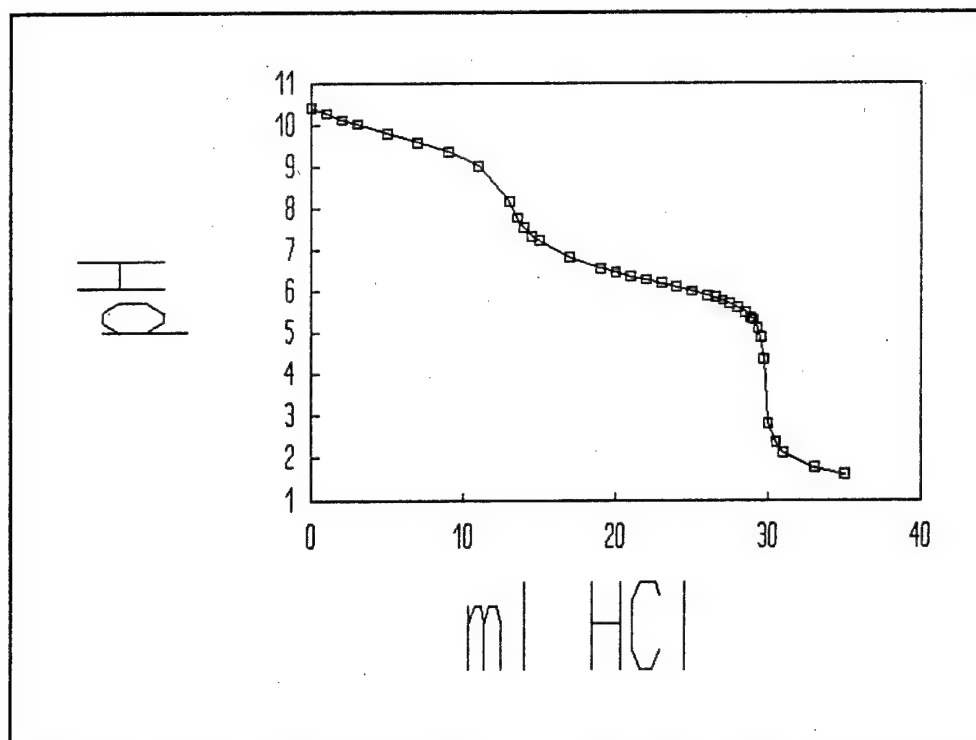


Figure C-199. Curve For The First Titration Of Spent 75 Micron Sodium Bicarbonate Media With 0.981 M HCl.

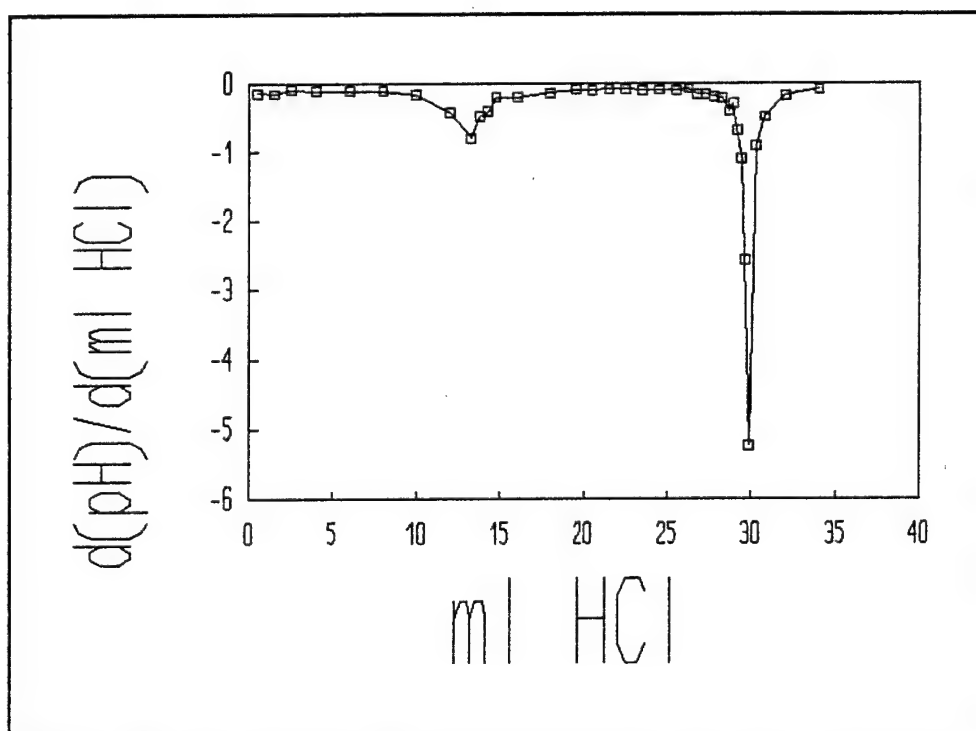


Figure C-200. First Derivative Of The First Titration Curve For Titration Of Spent 75 Micron Sodium Bicarbonate Media With 0.981 M HCl.

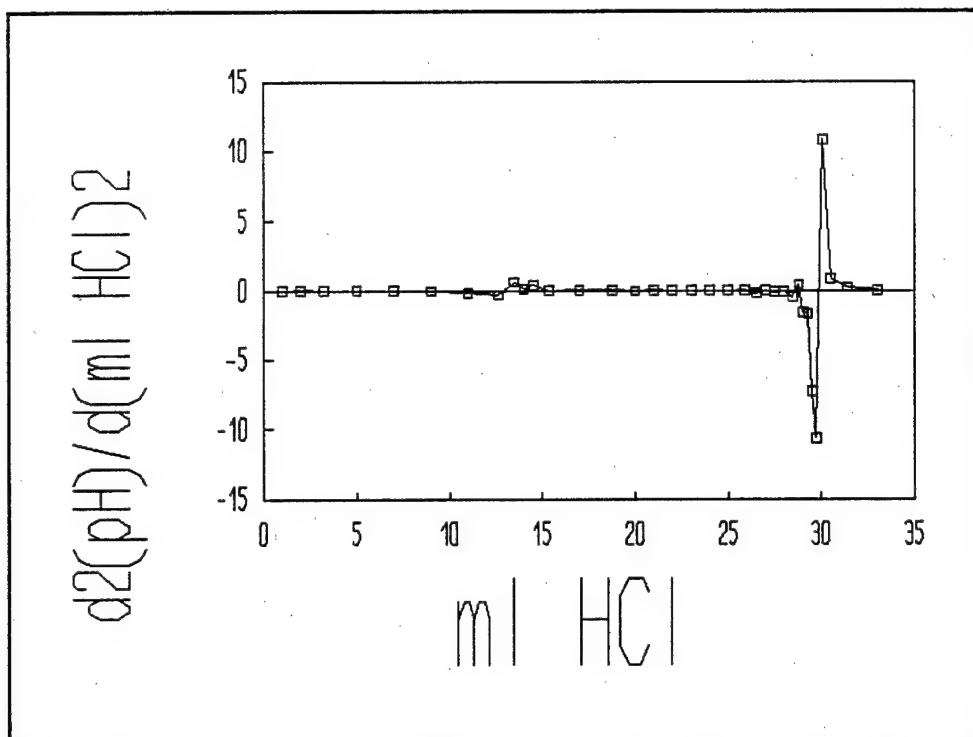


Figure C-201. Second Derivative Of The First Titration Curve For Titration Of Spent 75 Micron Sodium Bicarbonate Media With 0.981 M HCl.

TABLE 67. SPENT 75 MICRON SODIUM BICARBONATE MEDIA - TITRATION 2.

<u>ml 0.981M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d²(pH)/d(ml)²</u>
0.0	10.554	1.00	-0.14	2.00	0.01
2.0	10.282	3.00	-0.11	4.00	0.00
4.0	10.059	5.00	-0.11	6.00	0.01
6.0	9.841	7.00	-0.09	8.00	-0.00
8.0	9.660	9.00	-0.09	10.00	-0.02
10.0	9.471	11.00	-0.13	12.00	-0.07
12.0	9.215	13.00	-0.27	13.63	-0.43
14.0	8.683	14.25	-0.80	14.50	0.13
14.5	8.281	14.75	-0.74	15.00	0.23
15.0	7.912	15.25	-0.62	15.50	0.49
15.5	7.601	15.75	-0.38	16.13	0.15
16.0	7.413	16.50	-0.26	17.00	0.06
17.0	7.148	17.50	-0.20	18.25	0.04
18.0	6.944	19.00	-0.15	20.00	0.01
20.0	6.652	21.00	-0.12	22.00	0.02
22.0	6.409	23.00	-0.09	24.00	-0.01
24.0	6.238	25.00	-0.10	26.00	-0.01
26.0	6.045	27.00	-0.11	27.75	-0.03
28.0	5.819	28.50	-0.15	29.00	-0.08
29.0	5.668	29.50	-0.24	29.88	-0.19
30.0	5.433	30.25	-0.38	30.50	-1.31
30.5	5.244	30.75	-1.03	30.95	-10.34
31.0	4.727	31.15	-5.17	31.30	10.87
31.3	3.176	31.45	-1.91	31.63	3.26
31.6	2.603	31.80	-0.77	32.15	0.63
32.0	2.296	32.50	-0.32	33.00	0.14
33.0	1.973	33.50	-0.18	34.00	0.09
34.0	1.794	34.50	-0.09	26.00	-0.01
35.0	1.702	17.50	0.05	8.75	0.00

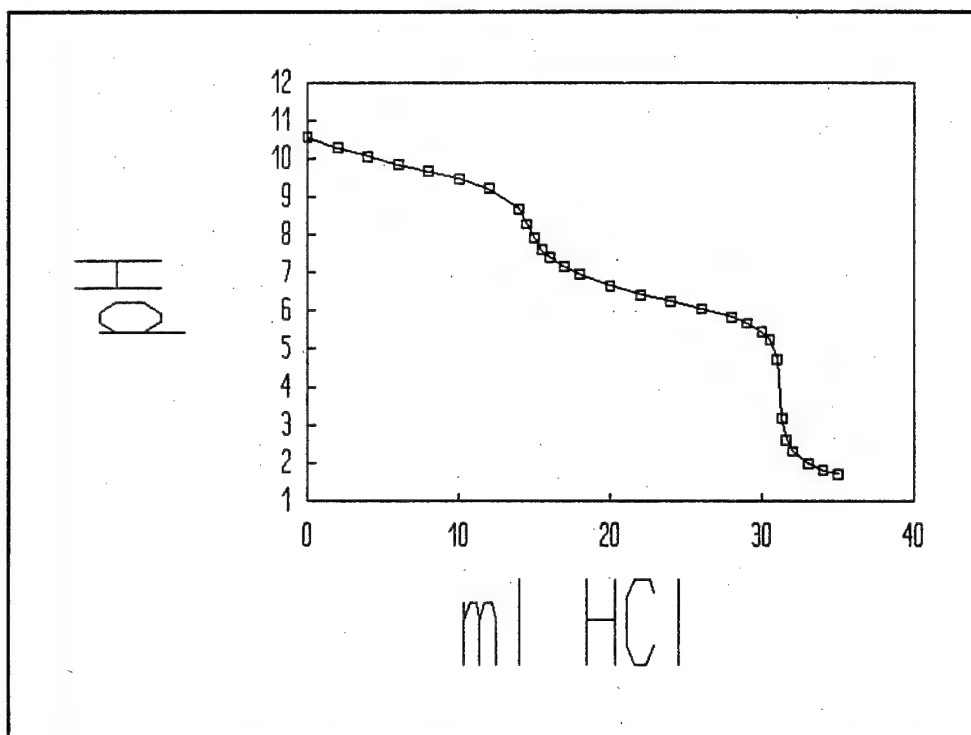


Figure C-202. Curve For The Second Titration Of Spent 75 Micron Sodium Bicarbonate Media With 0.981 M HCl.

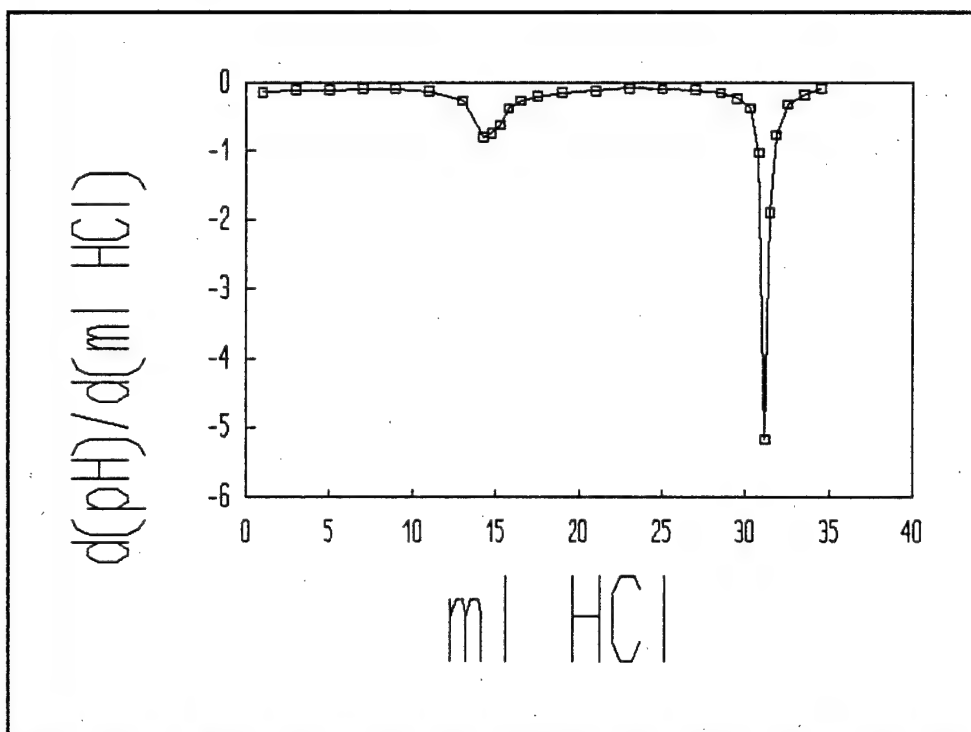


Figure C-203. First Derivative Of The Second Titration Curve For Titration Of Spent 75 Micron Sodium Bicarbonate Media With 0.981 M HCl.

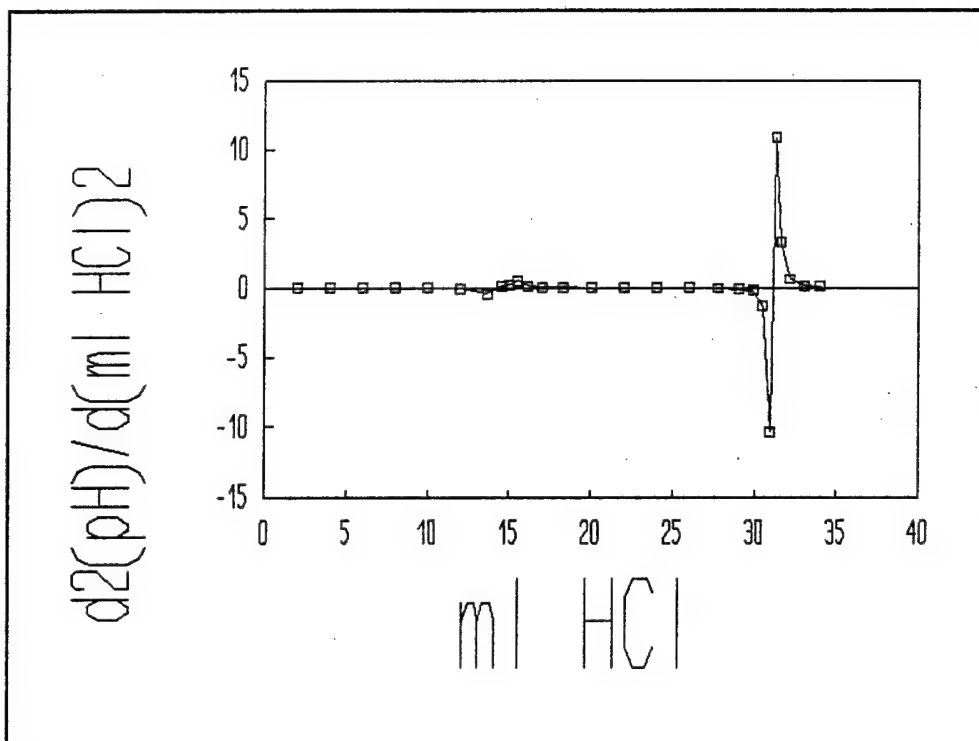


Figure C-204. Second Derivative Of The Second Titration Curve For Titration Of Spent 75 Micron Sodium Bicarbonate Media With 0.981 M HCl.

TABLE 68. SPENT 75 MICRON SODIUM BICARBONATE MEDIA - TITRATION 3.

<u>ml 0.981M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	10.698	1.00	-0.16	2.00	0.01
2.0	10.385	3.00	-0.14	4.00	0.01
4.0	10.104	5.00	-0.11	6.00	-0.01
6.0	9.880	7.00	-0.12	8.00	-0.00
8.0	9.634	9.00	-0.13	10.00	-0.05
10.0	9.375	11.00	-0.22	12.00	-0.14
12.0	8.927	13.00	-0.51	13.63	-0.20
14.0	7.911	14.25	-0.75	14.50	0.76
14.5	7.535	14.75	-0.37	15.00	0.13
15.0	7.349	15.25	-0.31	15.50	0.14
15.5	7.196	15.75	-0.24	16.38	0.06
16.0	7.078	17.00	-0.17	18.00	0.03
18.0	6.745	19.00	-0.11	20.00	0.01
20.0	6.517	21.00	-0.09	22.00	0.00
22.0	6.329	23.00	-0.09	24.00	0.01
24.0	6.159	25.00	-0.07	26.00	-0.01
26.0	6.011	27.00	-0.09	27.75	-0.03
28.0	5.827	28.50	-0.13	29.00	0.00
29.0	5.695	29.50	-0.13	29.88	-0.23
30.0	5.568	30.25	-0.30	30.50	-0.30
30.5	5.419	30.75	-0.45	31.00	-0.78
31.0	5.195	31.25	-0.84	31.43	-6.61
31.5	4.777	31.60	-3.15	31.68	-28.47
31.7	4.147	31.75	-7.42	31.83	27.30
31.8	3.405	31.90	-3.32	32.08	7.15
32.0	2.740	32.25	-0.82	32.50	0.77
32.5	2.328	32.75	-0.44	33.13	0.30
33.0	2.109	33.50	-0.21	34.00	0.08
34.0	1.896	34.50	-0.13	26.00	-0.01
35.0	1.767	17.50	0.05	8.75	0.00

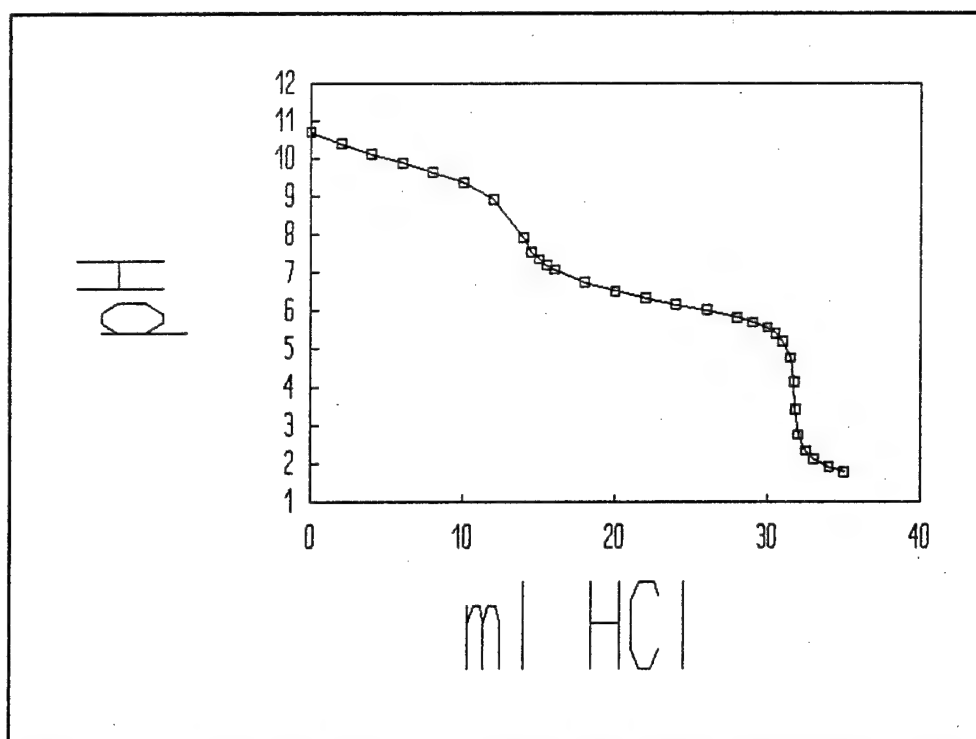


Figure C-205. Curve For The Third Titration Of Spent 75 Micron Sodium Bicarbonate Media With 0.981 M HCl.

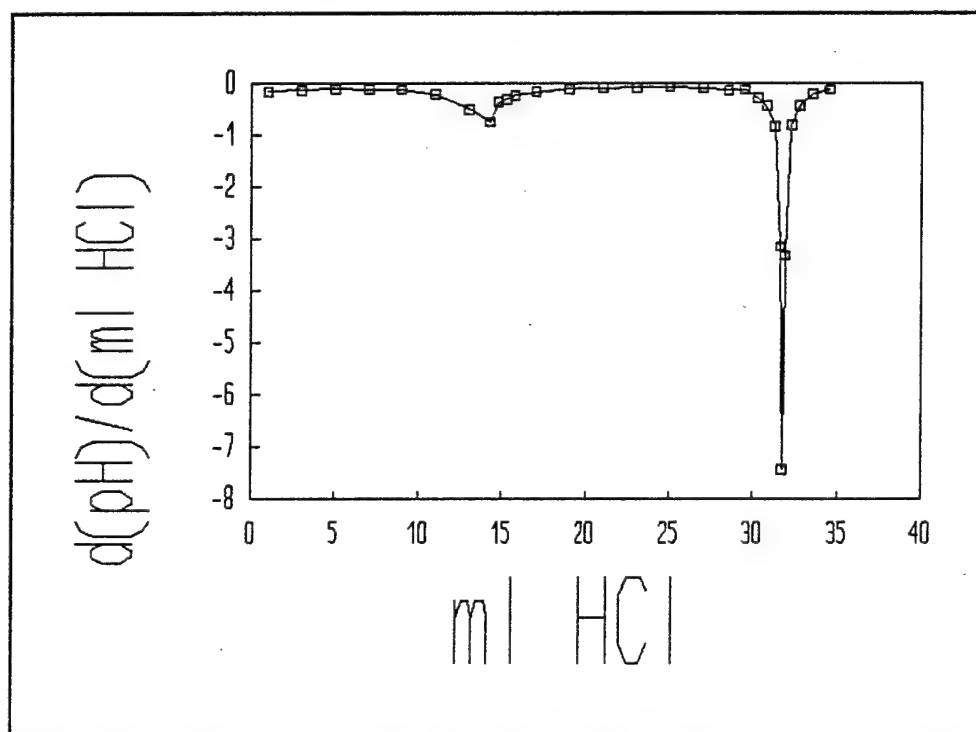


Figure C-206. First Derivative Of The Third Titration Curve For Titration Of Spent 75 Micron Sodium Bicarbonate Media With 0.981 M HCl.

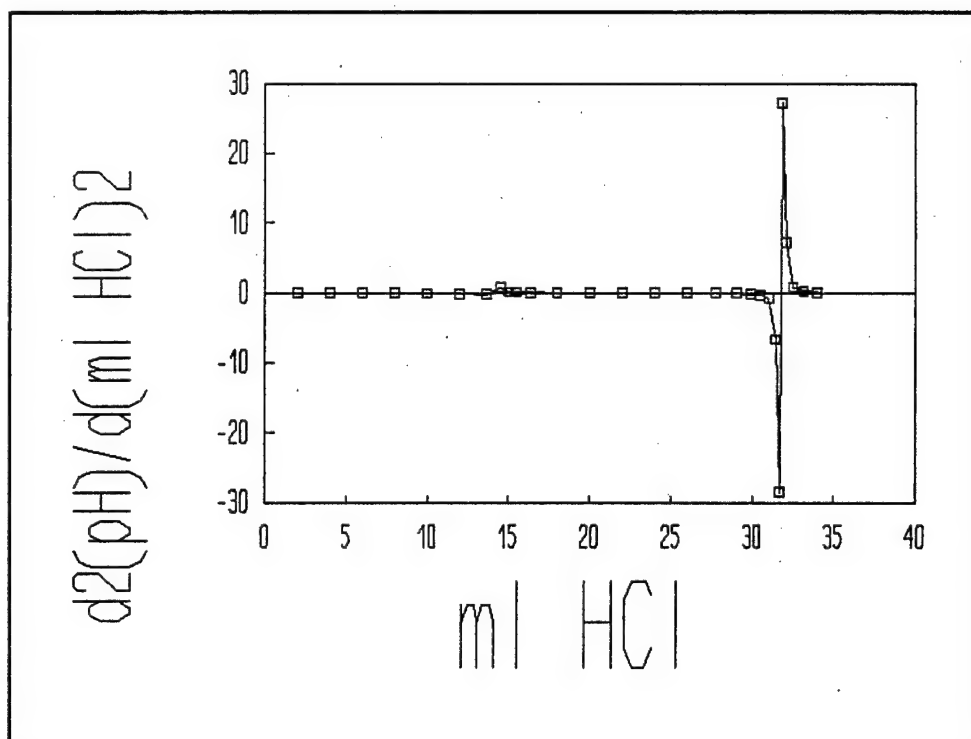


Figure C-207. Second Derivative Of The Third Titration Curve For Titration Of Spent 75 Micron Sodium Bicarbonate Media With 0.981 M HCl.

TABLE 69. SPENT 75 MICRON SODIUM BICARBONATE MEDIA - TITRATION 4.

<u>ml 0.981M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	10.666	1.00	-0.16	2.00	0.02
2.0	10.338	3.00	-0.13	4.00	0.03
4.0	10.074	5.00	-0.08	6.00	-0.01
6.0	9.912	7.00	-0.09	8.00	-0.03
8.0	9.728	9.00	-0.16	10.00	0.02
10.0	9.407	11.00	-0.12	12.00	-0.18
12.0	9.174	13.00	-0.48	13.63	-0.31
14.0	8.223	14.25	-0.86	14.50	0.48
14.5	7.793	14.75	-0.62	15.00	0.51
15.0	7.483	15.25	-0.36	15.50	0.14
15.5	7.301	15.75	-0.29	16.38	0.08
16.0	7.155	17.00	-0.19	18.00	0.02
18.0	6.782	19.00	-0.14	20.00	0.02
20.0	6.501	21.00	-0.09	22.00	0.00
22.0	6.316	23.00	-0.09	24.00	-0.01
24.0	6.139	25.00	-0.10	26.00	0.01
26.0	5.940	27.00	-0.07	27.75	-0.08
28.0	5.796	28.50	-0.19	29.00	-0.12
29.0	5.609	29.50	-0.31	29.88	-0.53
30.0	5.300	30.25	-0.71	30.50	-5.91
30.5	4.945	30.75	-3.67	30.95	4.68
31.0	3.112	31.15	-1.79	31.28	3.89
31.3	2.574	31.40	-0.82	31.53	1.44
31.5	2.410	31.65	-0.46	31.78	-0.18
31.8	2.272	31.90	-0.50	32.20	0.45
32.0	2.171	32.50	-0.24	33.00	0.09
33.0	1.936	33.50	-0.14	34.00	0.05
34.0	1.791	34.50	-0.09	26.00	-0.01
35.0	1.698	17.50	0.05	8.75	0.00

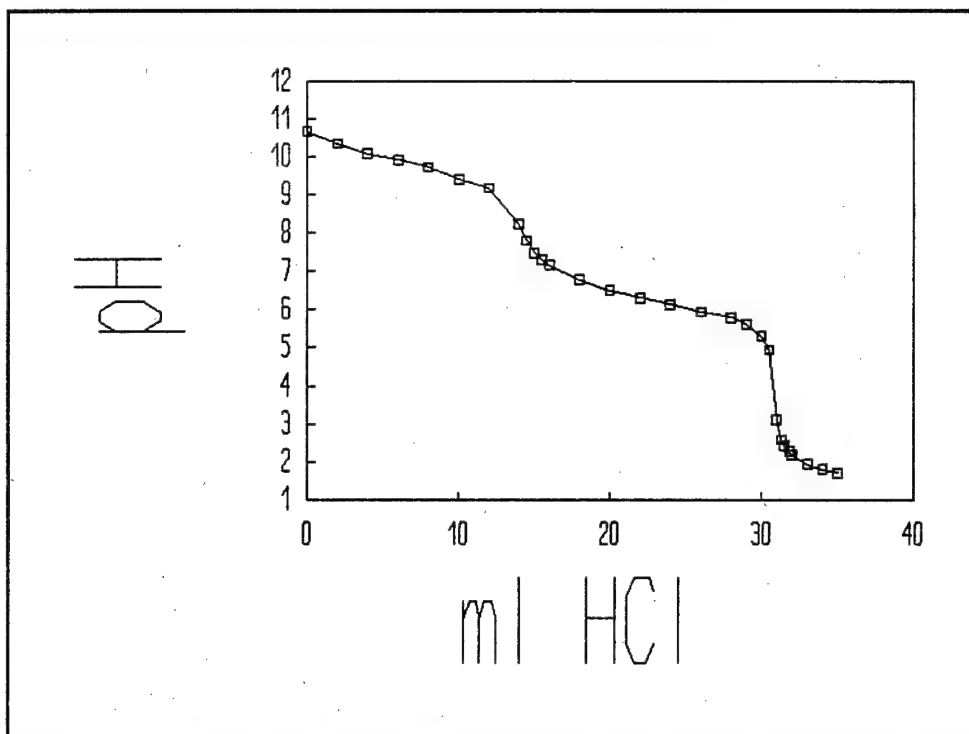


Figure C-208. Curve For The Fourth Titration Of Spent 75 Micron Sodium Bicarbonate Media With 0.981 M HCl.

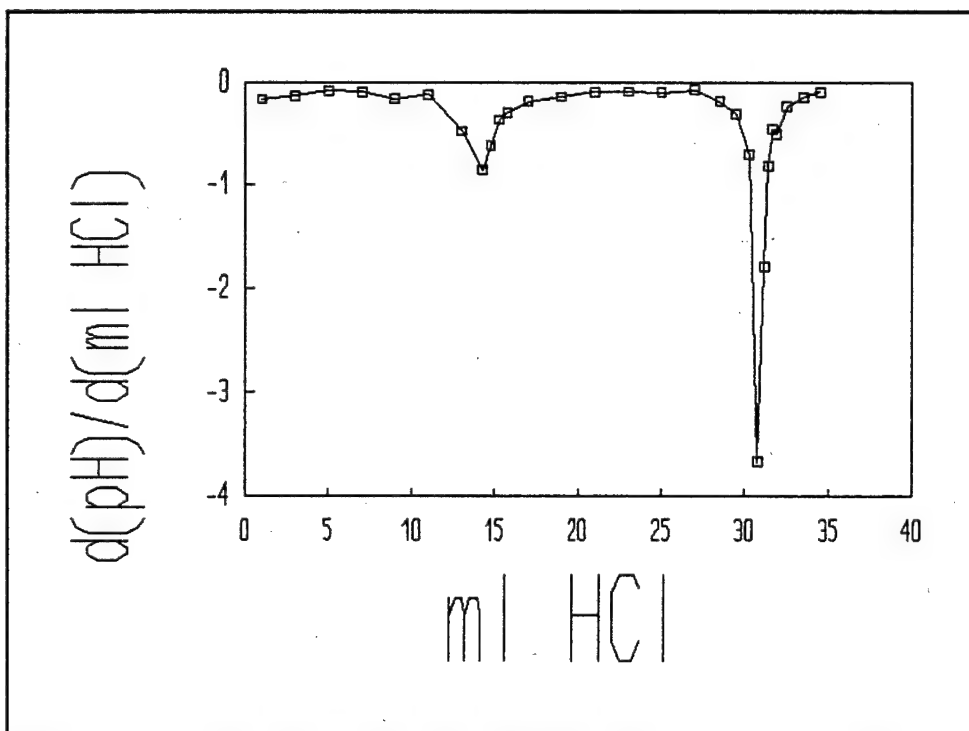


Figure C-209. First Derivative Of The Fourth Titration Curve For Titration Of Spent 75 Micron Sodium Bicarbonate Media With 0.981 M HCl.

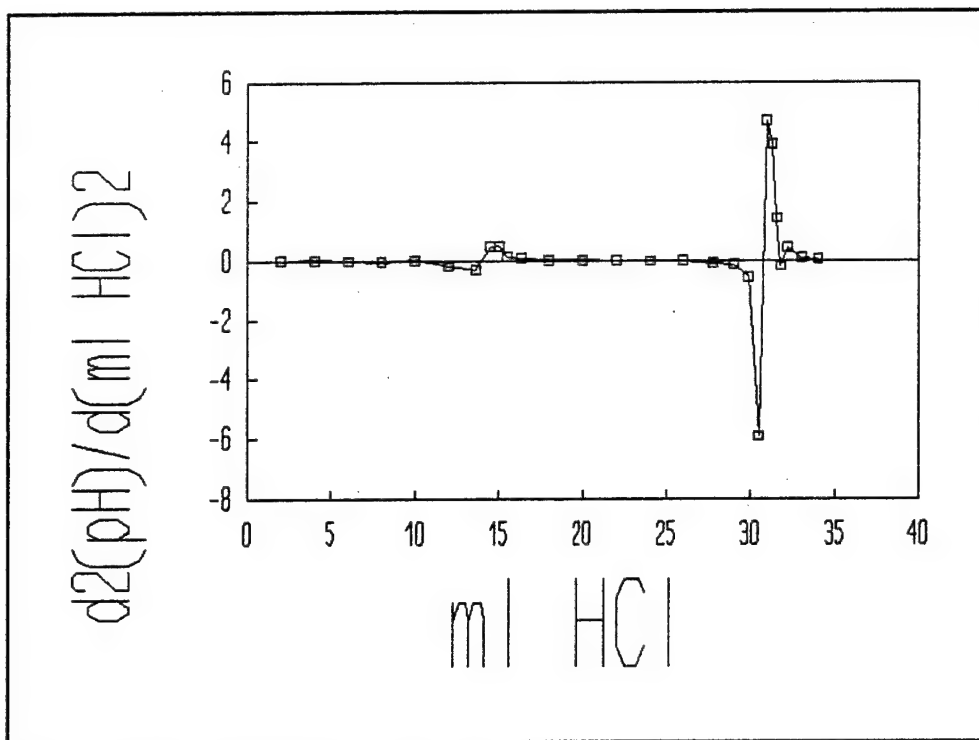


Figure C-210. Second Derivative Of The Fourth Titration Curve For Titration Of Spent 75 Micron Sodium Bicarbonate Media With 0.981 M HCl.

TABLE 70. SPENT 45 MICRON SODIUM BICARBONATE MEDIA - TITRATION 1.

ml 0.981M HCl	pH	Vol (ml)	d(pH)/d(ml)	Vol (ml)	d ² (pH)/d(ml) ²
0.0	11.153	1.00	-0.22	2.00	0.04
2.0	10.705	3.00	-0.15	4.00	0.02
4.0	10.398	5.00	-0.11	6.00	0.00
6.0	10.183	7.00	-0.10	8.00	0.01
8.0	9.984	9.00	-0.09	10.00	-0.02
10.0	9.809	11.00	-0.12	12.00	-0.00
12.0	9.564	13.00	-0.13	14.00	-0.04
14.0	9.306	15.00	-0.22	15.75	-0.15
16.0	8.871	16.50	-0.45	16.88	-0.38
17.0	8.423	17.25	-0.73	17.50	-0.32
17.5	8.058	17.75	-0.89	18.00	0.94
18.0	7.614	18.25	-0.42	18.50	0.28
18.5	7.404	18.75	-0.28	19.38	0.05
19.0	7.264	20.00	-0.22	21.00	0.04
21.0	6.832	22.00	-0.13	23.00	0.01
23.0	6.562	24.00	-0.11	25.00	0.01
25.0	6.336	26.00	-0.08	27.00	0.01
27.0	6.167	28.00	-0.07	29.00	-0.03
29.0	6.026	30.00	-0.13	30.75	-0.03
31.0	5.759	31.50	-0.18	31.85	0.33
32.0	5.581	32.20	0.05	32.45	-0.64
32.4	5.602	32.70	-0.27	32.97	-1.09
33.0	5.443	33.25	-0.86	33.50	-5.68
33.5	5.011	33.75	-3.70	33.93	4.01
34.0	3.160	34.10	-2.30	34.22	5.48
34.2	2.700	34.35	-0.93	34.47	1.88
34.5	2.421	34.60	-0.46	34.72	0.03
34.7	2.329	34.85	-0.45	35.18	0.34
35.0	2.193	35.50	-0.23	36.00	0.08
36.0	1.960	36.50	-0.15	37.13	0.05
37.0	1.809	37.75	-0.09	38.50	0.02
38.5	1.668	39.25	-0.06	29.63	-0.01
40.0	1.575	20.00	0.04	10.00	0.00

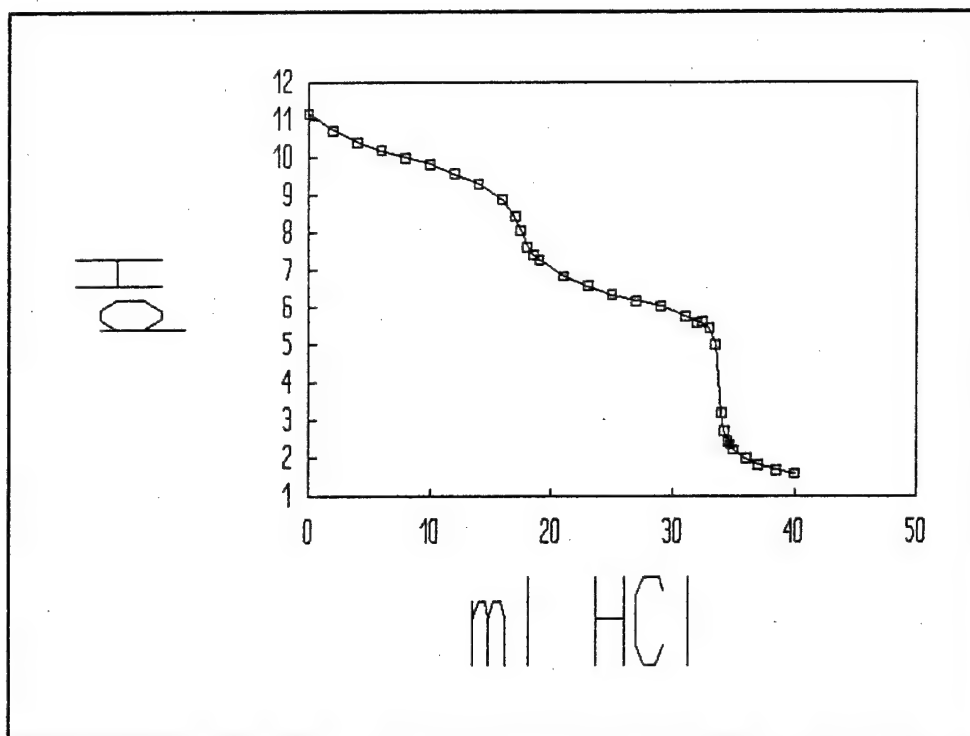


Figure C-211. Curve For The First Titration Of Spent 45 Micron Sodium Bicarbonate Media With 0.981 M HCl.

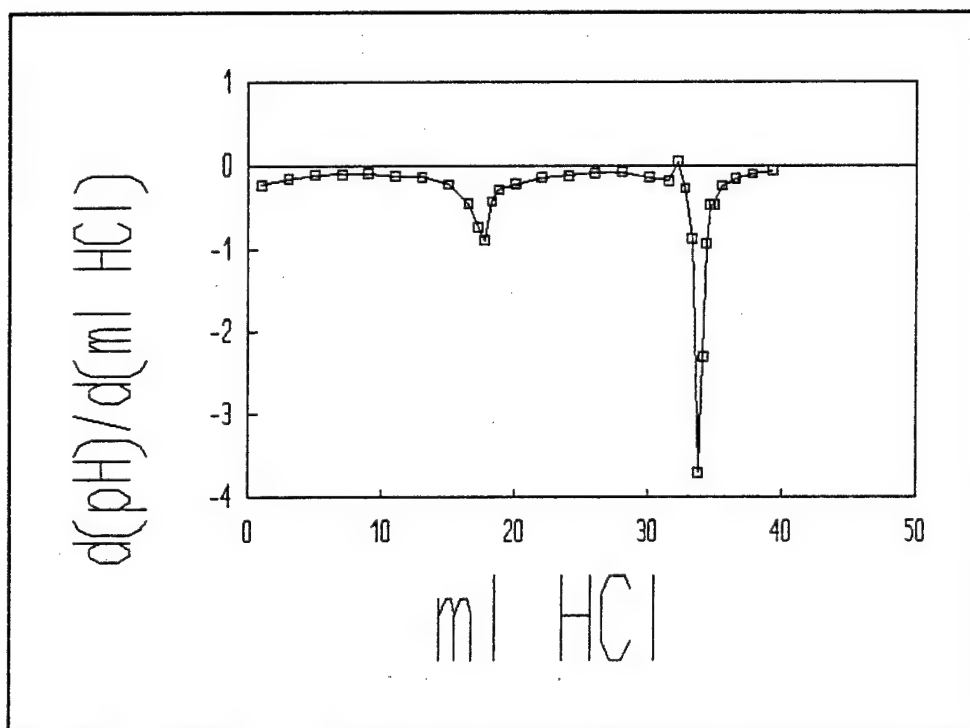


Figure C-212. First Derivative Of The First Titration Curve For Titration Of Spent 45 Micron Sodium Bicarbonate Media With 0.981 M HCl.

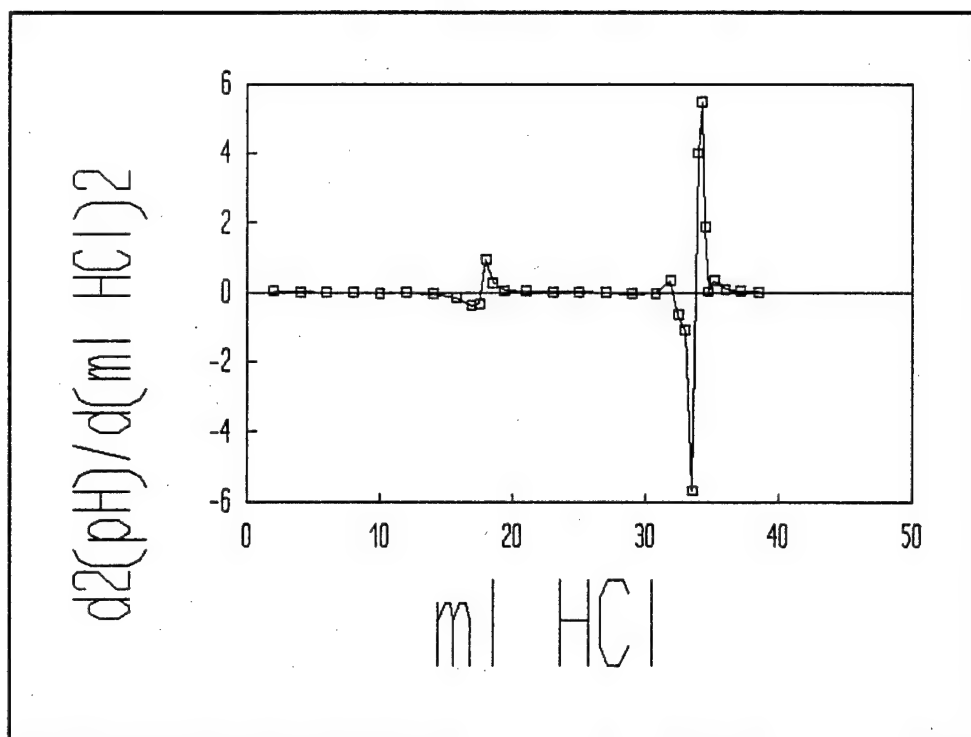


Figure C-213. Second Derivative Of The First Titration Curve For Titration Of Spent 45 Micron Sodium Bicarbonate Media With 0.981 M HCl.

TABLE 71. SPENT 45 MICRON SODIUM BICARBONATE MEDIA - TITRATION 2.

<u>ml 0.981M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d²(pH)/d(ml)²</u>
0.0	11.164	1.00	-0.23	2.00	0.05
2.0	10.704	3.00	-0.14	4.00	0.01
4.0	10.427	5.00	-0.13	6.00	0.01
6.0	10.175	7.00	-0.11	8.00	-0.01
8.0	9.954	9.00	-0.12	10.00	-0.01
10.0	9.708	11.00	-0.13	12.00	-0.02
12.0	9.440	13.00	-0.18	13.75	-0.08
14.0	9.076	14.50	-0.31	15.00	-0.39
15.0	8.768	15.50	-0.70	15.88	-0.12
16.0	8.071	16.25	-0.79	16.50	0.78
16.5	7.676	16.75	-0.40	17.00	-0.06
17.0	7.475	17.25	-0.43	17.50	0.46
17.5	7.258	17.75	-0.20	18.38	0.02
18.0	7.157	19.00	-0.18	20.00	0.03
20.0	6.797	21.00	-0.12	22.00	0.01
22.0	6.559	23.00	-0.10	24.00	0.01
24.0	6.354	25.00	-0.08	26.00	-0.00
26.0	6.194	27.00	-0.08	28.00	0.01
28.0	6.027	29.00	-0.07	29.75	0.01
30.0	5.882	30.50	-0.06	31.00	-0.21
31.0	5.820	31.50	-0.27	32.00	-0.06
32.0	5.549	32.50	-0.33	32.80	-0.53
33.0	5.218	33.10	-0.65	33.22	-3.87
33.2	5.088	33.35	-1.62	33.47	-9.85
33.5	4.603	33.60	-4.08	33.72	3.04
33.7	3.787	33.85	-3.32	34.05	6.10
34.0	2.791	34.25	-0.88	34.50	0.79
34.5	2.352	34.75	-0.48	35.13	0.38
35.0	2.111	35.50	-0.19	36.00	0.05
36.0	1.916	36.50	-0.14	37.00	-0.07
37.0	1.772	37.50	-0.21	38.25	0.13
38.0	1.562	39.00	-0.01	29.50	-0.00
40.0	1.544	20.00	0.04	10.00	0.00

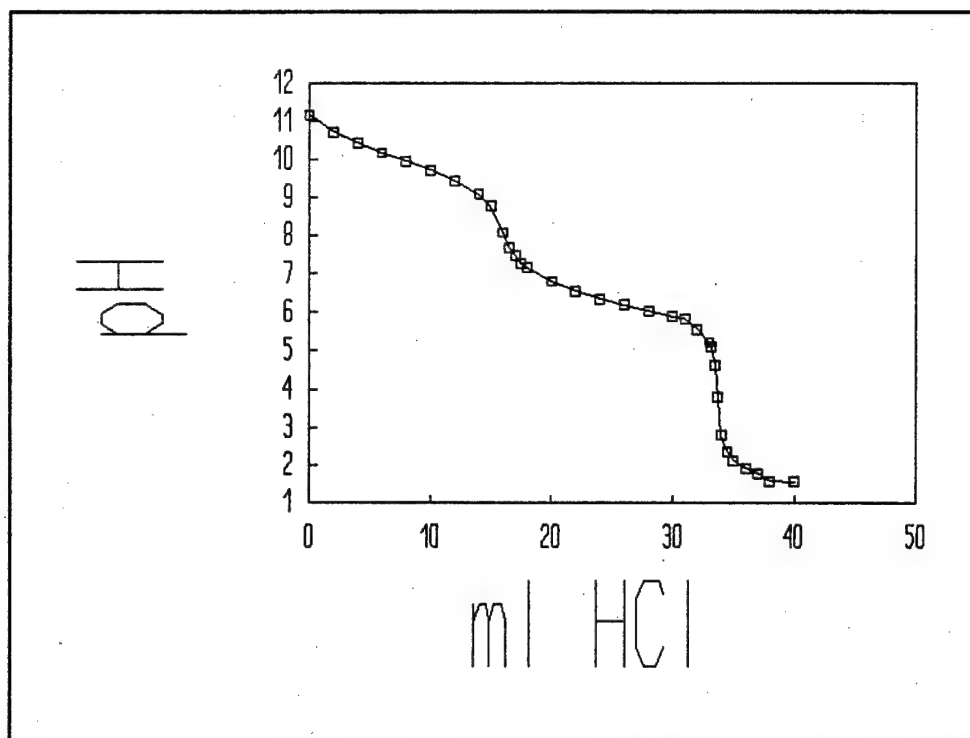


Figure C-214. Curve For The Second Titration Of Spent 45 Micron Sodium Bicarbonate Media With 0.981 M HCl.

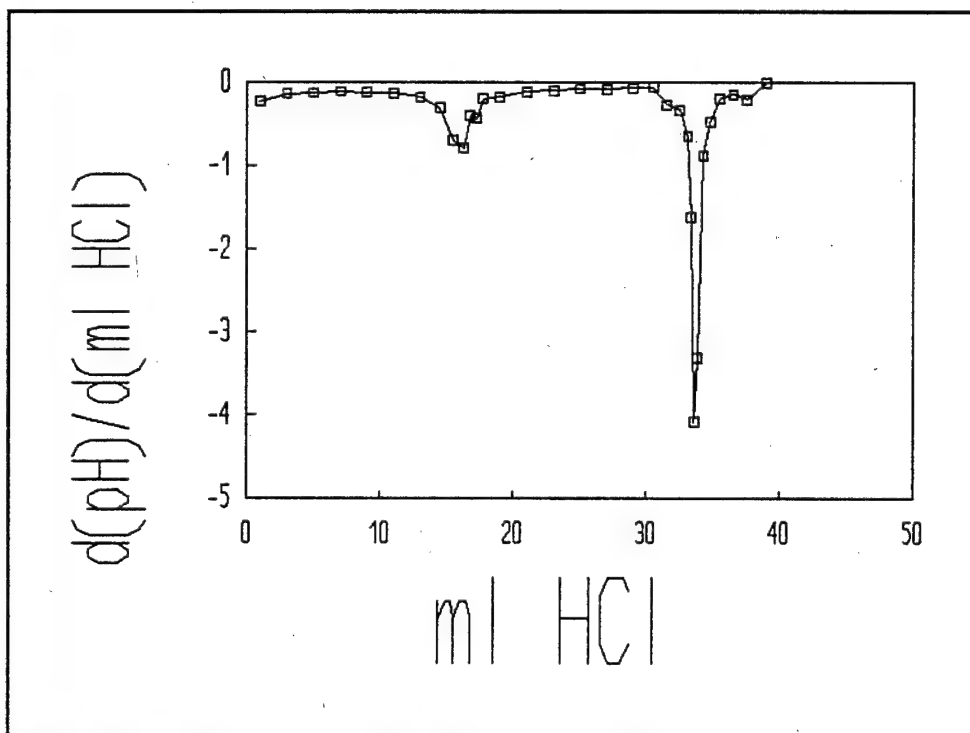


Figure C-215. First Derivative Of The Second Titration Curve For Titration Of Spent 45 Micron Sodium Bicarbonate Media With 0.981 M HCl.

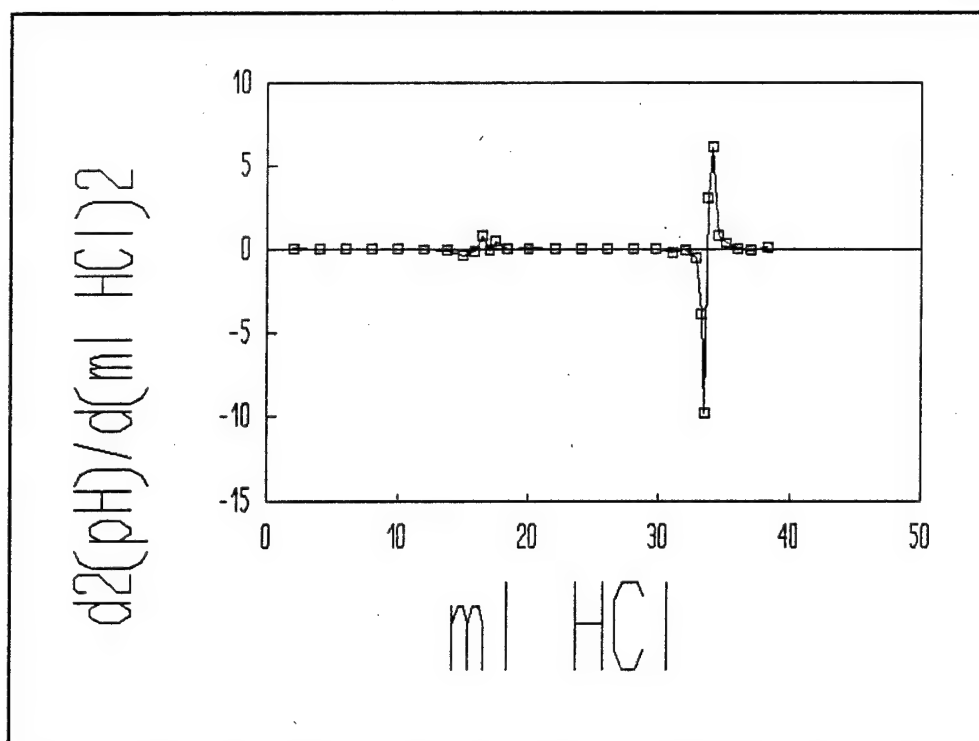


Figure C-216. Second Derivative Of The Second Titration Curve For Titration Of Spent 45 Micron Sodium Bicarbonate Media With 0.981 M HCl.

TABLE 72. SPENT 45 MICRON SODIUM BICARBONATE MEDIA - TITRATION 3.

<u>ml 0.981M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	11.493	1.00	-0.33	2.00	0.08
2.0	10.832	3.00	-0.18	4.00	0.02
4.0	10.472	5.00	-0.13	6.00	0.01
6.0	10.205	7.00	-0.10	8.00	-0.00
8.0	9.996	9.00	-0.11	10.00	-0.01
10.0	9.781	11.00	-0.12	12.00	-0.01
12.0	9.538	13.00	-0.14	13.75	-0.00
14.0	9.260	14.50	-0.14	15.00	-0.16
15.0	9.116	15.50	-0.31	15.88	-0.13
16.0	8.807	16.25	-0.40	16.50	-0.57
16.5	8.605	16.75	-0.69	17.00	-0.24
17.0	8.261	17.25	-0.81	17.50	0.60
17.5	7.856	17.75	-0.51	18.00	-0.02
18.0	7.601	18.25	-0.52	18.50	0.18
18.5	7.342	18.75	-0.43	19.13	0.34
19.0	7.127	19.50	-0.18	20.25	0.02
20.0	6.949	21.00	-0.15	22.00	0.02
22.0	6.651	23.00	-0.11	24.00	0.01
24.0	6.427	25.00	-0.10	26.00	0.00
26.0	6.233	27.00	-0.09	27.75	0.01
28.0	6.047	28.50	-0.08	29.00	0.05
29.0	5.965	29.50	-0.03	30.00	-0.10
30.0	5.937	30.50	-0.13	31.00	-0.03
31.0	5.811	31.50	-0.15	31.88	0.02
32.0	5.659	32.25	-0.14	32.50	-0.18
32.5	5.589	32.75	-0.23	32.93	-0.09
33.0	5.475	33.10	-0.26	33.20	0.22
33.2	5.423	33.30	-0.21	33.40	-1.53
33.4	5.380	33.50	-0.52	33.60	-0.60
33.6	5.276	33.70	-0.64	33.80	0.35
33.8	5.148	33.90	-0.57	34.00	-3.98
34.0	5.034	34.10	-1.36	34.18	-7.90
34.2	4.761	34.25	-2.55	34.33	0.07
34.3	4.506	34.40	-2.54	34.50	-13.88
34.5	3.998	34.60	-5.31	34.68	21.63
34.7	2.935	34.75	-2.07	34.83	5.87
34.8	2.728	34.90	-1.19	35.20	1.23
35.0	2.490	35.50	-0.45	36.00	0.28
36.0	2.040	36.50	-0.17	37.13	0.05
37.0	1.870	37.75	-0.10	38.50	0.02
38.5	1.717	39.25	-0.07	29.63	-0.01
40.0	1.606	20.00	0.04	10.00	0.00

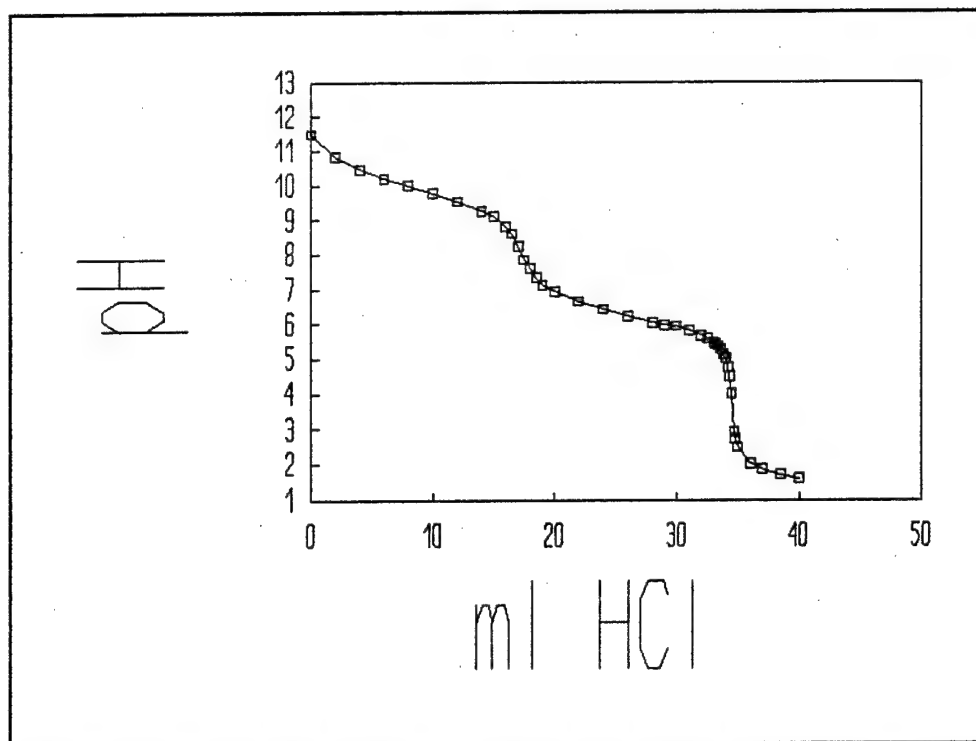


Figure C-217. Curve For The Third Titration Of Spent 45 Micron Sodium Bicarbonate Media With 0.981 M HCl.

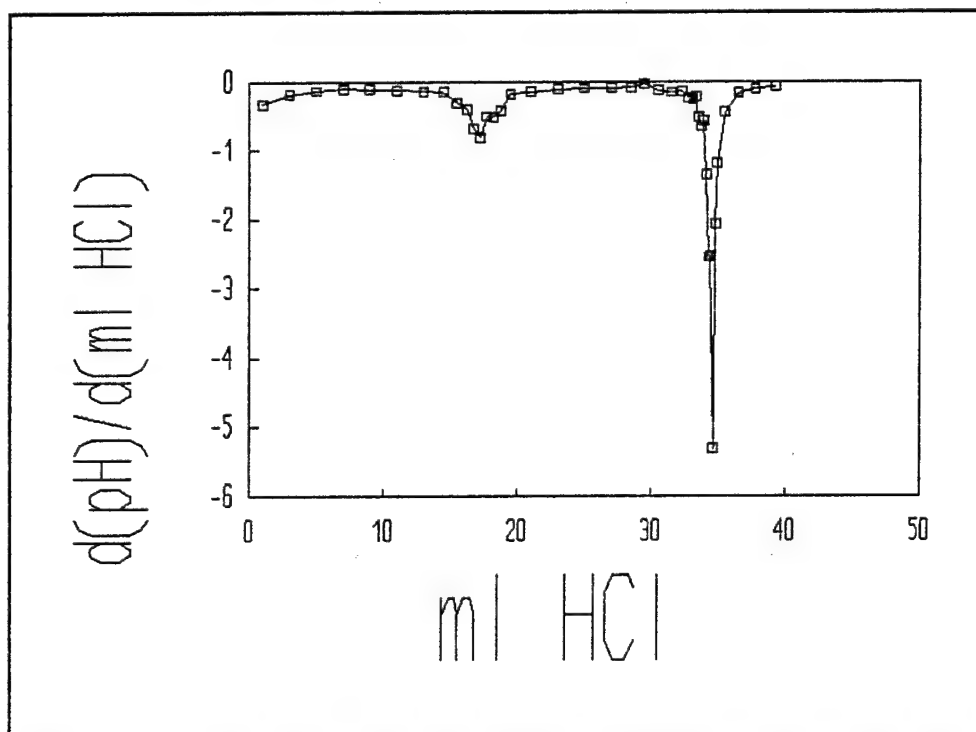


Figure C-218. First Derivative Of The Third Titration Curve For Titration Of Spent 45 Micron Sodium Bicarbonate Media With 0.981 M HCl.

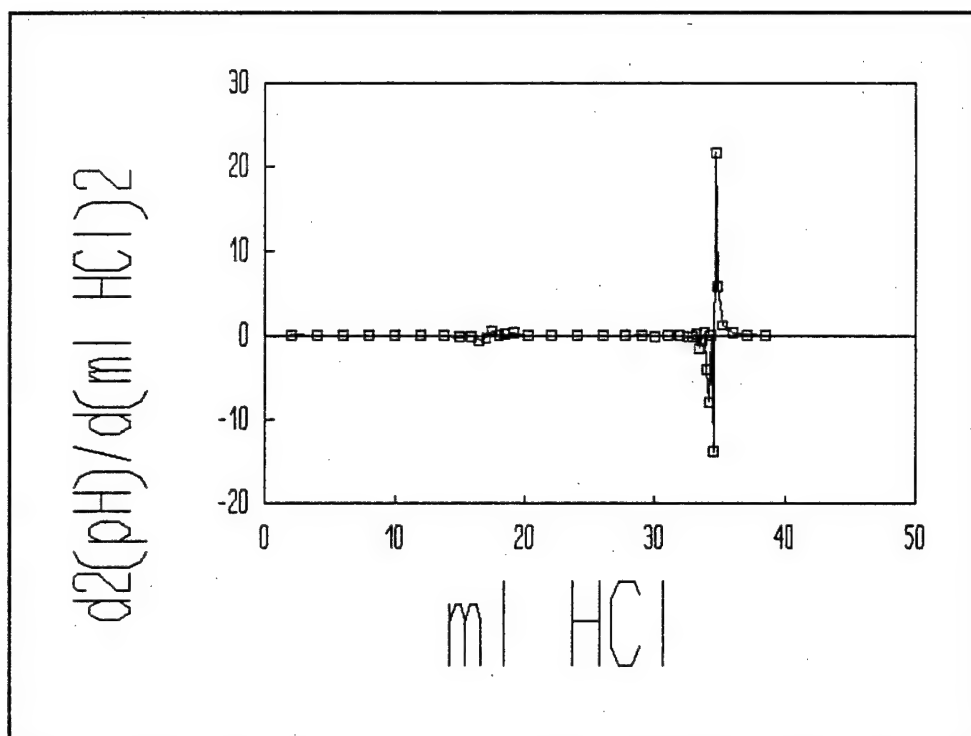


Figure C-219. Second Derivative Of The Third Titration Curve For Titration Of Spent 45 Micron Sodium Bicarbonate Media With 0.981 M HCl.

TABLE 73. SPENT 45 MICRON SODIUM BICARBONATE MEDIA - TITRATION 4.

<u>ml 0.981M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	11.680	1.00	-0.41	2.00	0.12
2.0	10.855	3.00	-0.17	4.00	0.01
4.0	10.515	5.00	-0.14	6.00	0.02
6.0	10.234	7.00	-0.09	8.00	-0.02
8.0	10.050	9.00	-0.13	10.00	0.01
10.0	9.800	11.00	-0.10	12.00	-0.02
12.0	9.592	13.00	-0.14	14.00	-0.05
14.0	9.312	15.00	-0.24	15.63	-0.04
16.0	8.840	16.25	-0.29	16.50	-0.90
16.5	8.696	16.75	-0.74	17.00	-1.40
17.0	8.327	17.25	-1.44	17.50	2.61
17.5	7.609	17.75	-0.13	18.00	-0.05
18.0	7.543	18.25	-0.16	18.50	-0.20
18.5	7.464	18.75	-0.26	19.13	-0.25
19.0	7.334	19.50	-0.45	20.25	0.21
20.0	6.884	21.00	-0.14	22.00	-0.01
22.0	6.602	23.00	-0.16	24.00	0.03
24.0	6.287	25.00	-0.11	26.00	0.01
26.0	6.077	27.00	-0.09	27.75	0.01
28.0	5.888	28.50	-0.09	29.00	-0.03
29.0	5.802	29.50	-0.11	30.00	-0.01
30.0	5.689	30.50	-0.12	30.88	-0.07
31.0	5.569	31.25	-0.17	31.45	0.07
31.5	5.483	31.65	-0.14	31.78	-0.39
31.8	5.440	31.90	-0.24	32.00	0.20
32.0	5.392	32.10	-0.20	32.20	-0.22
32.2	5.352	32.30	-0.24	32.40	0.20
32.4	5.303	32.50	-0.21	32.60	-0.87
32.6	5.262	32.70	-0.38	32.80	0.57
32.8	5.186	32.90	-0.26	33.00	-1.65
33.0	5.133	33.10	-0.59	33.20	-1.27
33.2	5.014	33.30	-0.85	33.40	-1.80
33.4	4.844	33.50	-1.21	33.60	-12.03
33.6	4.602	33.70	-3.61	33.80	-3.17
33.8	3.879	33.90	-4.25	34.00	9.88
34.0	3.029	34.10	-2.27	34.22	5.50
34.2	2.574	34.35	-0.90	34.55	1.07
34.5	2.304	34.75	-0.47	35.13	0.28
35.0	2.068	35.50	-0.26	36.25	0.10
36.0	1.803	37.00	-0.11	38.00	0.03
38.0	1.587	39.00	-0.05	29.50	-0.00
40.0	1.478	20.00	0.04	10.00	0.00

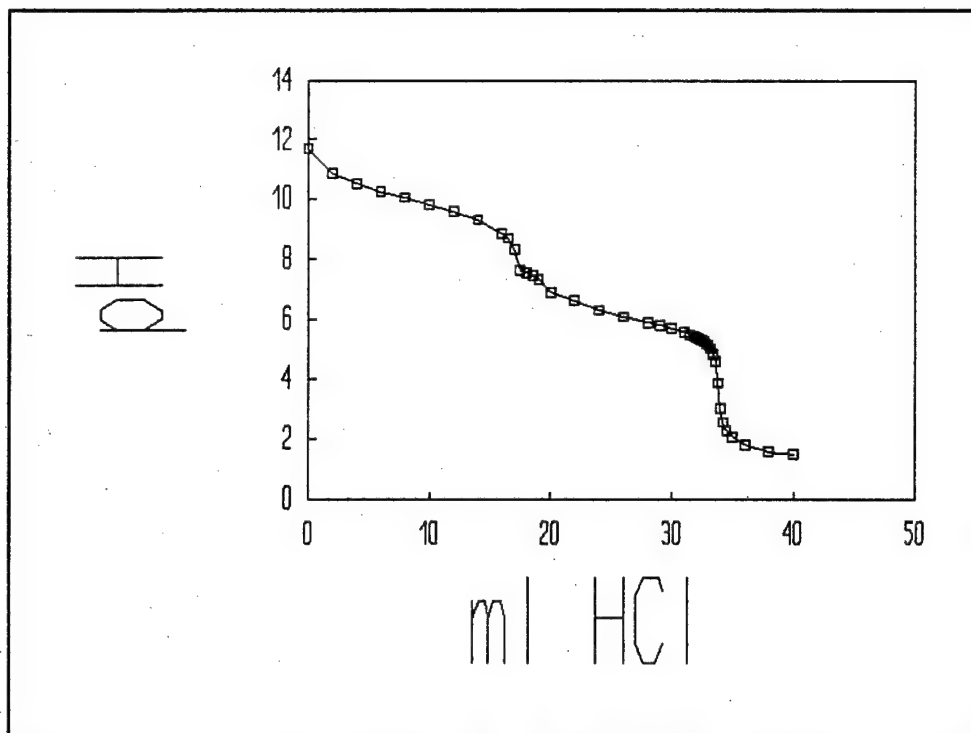


Figure C-220. Curve For The Fourth Titration Of Spent 45 Micron Sodium Bicarbonate Media With 0.981 M HCl.

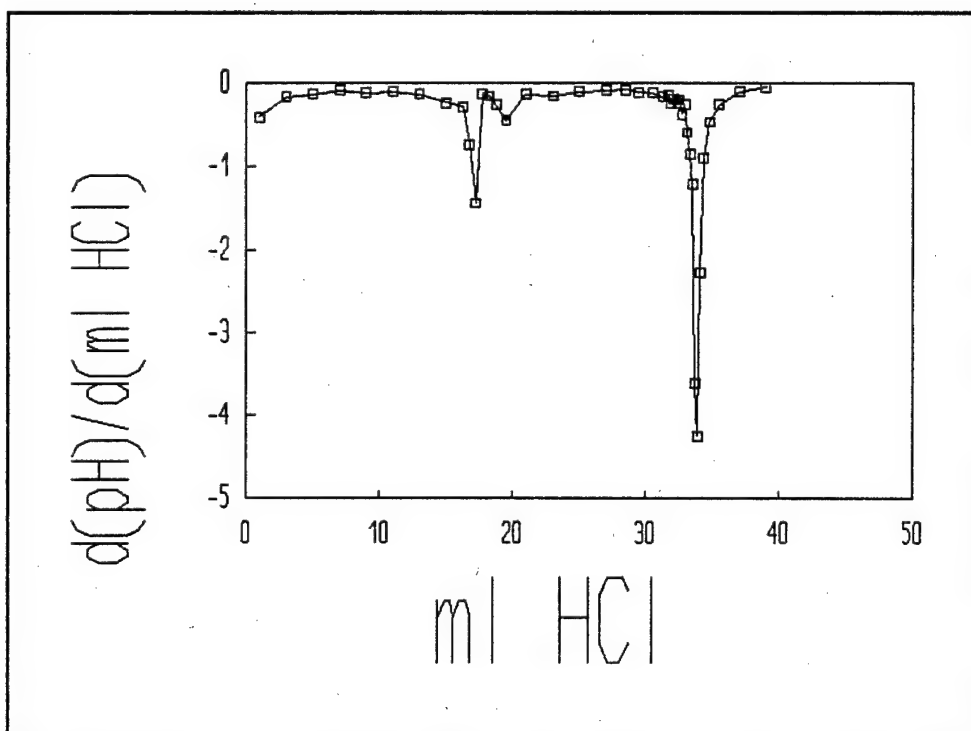


Figure C-221. First Derivative Of The Fourth Titration Curve For Titration Of Spent 45 Micron Sodium Bicarbonate Media With 0.981 M HCl.

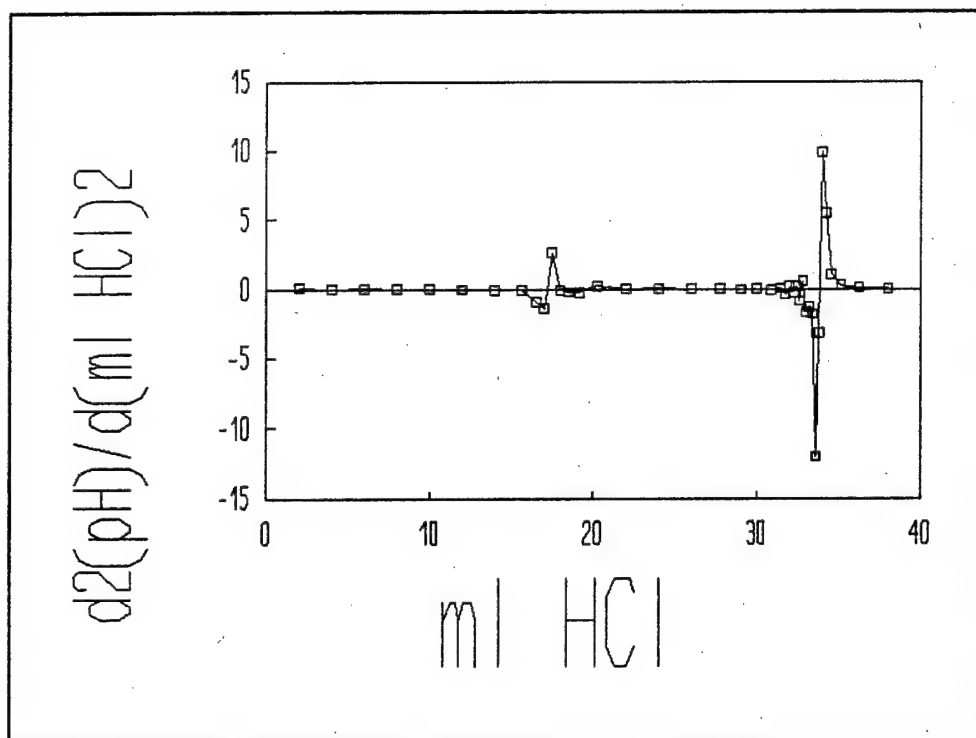


Figure C-222. Second Derivative Of The Fourth Titration Curve For Titration Of Spent 45 Micron Sodium Bicarbonate Media With 0.981 M HCl.

TABLE 74. SPENT <45 MICRON SODIUM BICARBONATE MEDIA - TITRATION 1.

<u>ml 0.981M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	11.534	1.00	-0.13	2.00	-0.03
2.0	11.279	3.00	-0.20	4.00	0.04
4.0	10.885	5.00	-0.11	6.00	0.02
6.0	10.670	7.00	-0.07	8.00	0.00
8.0	10.527	9.00	-0.07	10.00	-0.00
10.0	10.397	11.00	-0.07	12.00	0.02
12.0	10.249	13.00	-0.04	14.00	-0.00
14.0	10.178	15.00	-0.04	16.00	0.01
16.0	10.098	17.00	-0.03	18.00	-0.22
18.0	10.042	19.00	-0.46	20.00	0.10
20.0	9.121	21.00	-0.26	21.63	-1.59
22.0	8.602	22.25	-2.24	22.50	2.88
22.5	7.481	22.75	-0.80	23.38	0.43
23.0	7.080	24.00	-0.27	25.00	0.06
25.0	6.543	26.00	-0.14	27.00	0.01
27.0	6.256	28.00	-0.12	29.00	0.02
29.0	6.008	30.00	-0.08	30.75	-0.04
31.0	5.853	31.50	-0.13	32.00	0.01
32.0	5.723	32.50	-0.12	32.88	-0.02
33.0	5.606	33.25	-0.13	33.50	-0.02
33.5	5.540	33.75	-0.14	33.95	-0.34
34.0	5.470	34.15	-0.28	34.28	0.43
34.3	5.387	34.40	-0.17	34.53	-1.31
34.5	5.353	34.65	-0.50	34.78	-0.03
34.8	5.204	34.90	-0.50	35.00	-1.18
35.0	5.103	35.10	-0.74	35.20	-1.65
35.2	4.955	35.30	-1.07	35.40	-6.15
35.4	4.741	35.50	-2.30	35.60	-4.62
35.6	4.281	35.70	-3.22	35.80	-6.20
35.8	3.636	35.90	-4.46	36.08	9.91
36.0	2.743	36.25	-1.00	36.50	1.16
36.5	2.245	36.75	-0.42	37.13	0.25
37.0	2.036	37.50	-0.23	38.00	0.10
38.0	1.803	38.50	-0.13	39.00	0.04
39.0	1.672	39.50	-0.09	29.75	-0.01
40.0	1.578	20.00	0.04	10.00	0.00

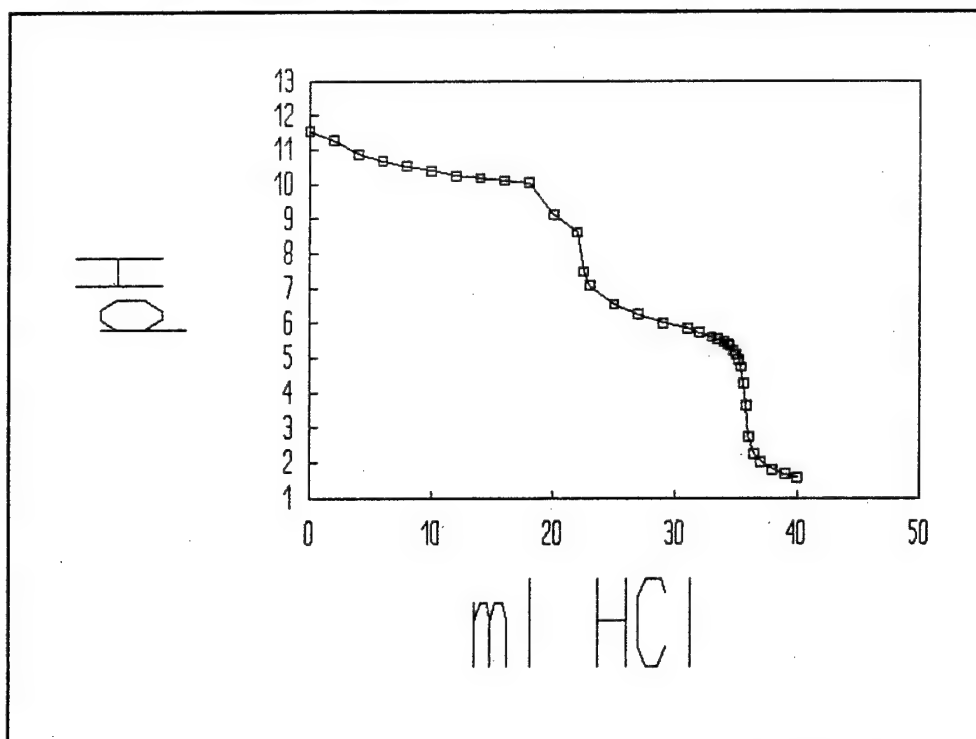


Figure C-223. Curve For The First Titration Of Spent <45 Micron Sodium Bicarbonate Media With 0.981 M HCl.

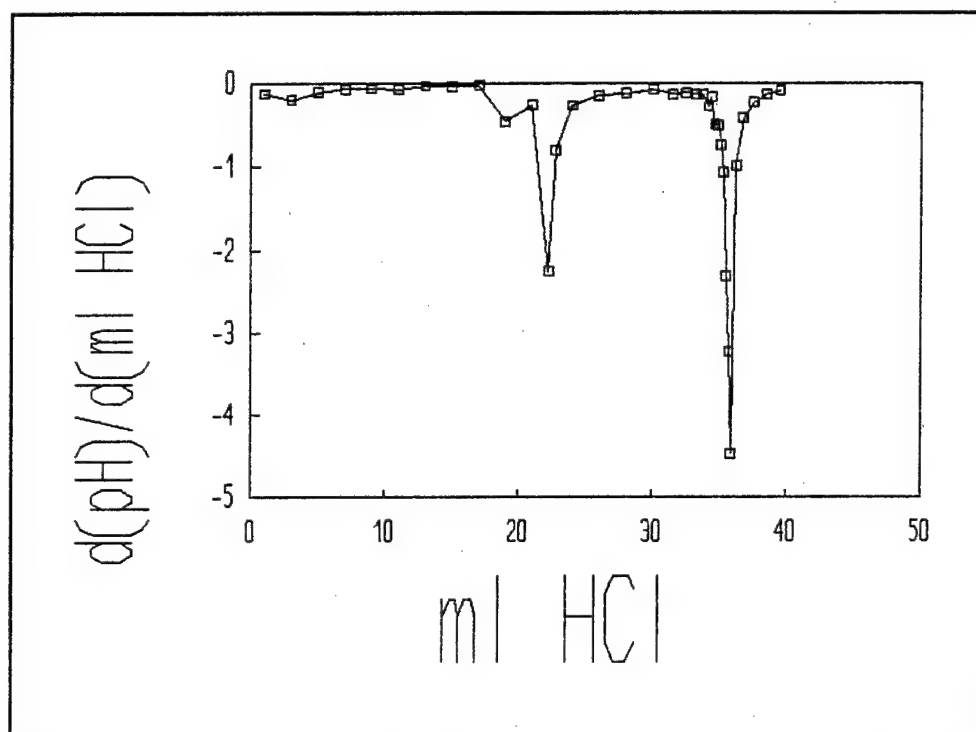


Figure C-224. First Derivative Of The First Titration Curve For Titration Of Spent <45 Micron Sodium Bicarbonate Media With 0.981 M HCl.

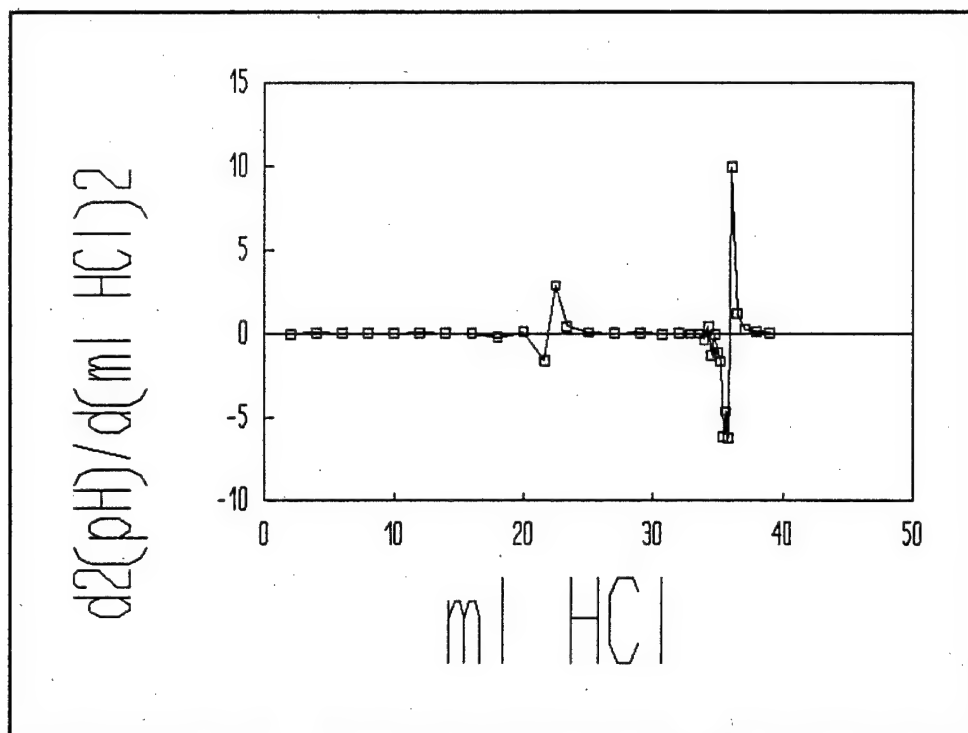


Figure C-225. Second Derivative Of The First Titration Curve For Titration Of Spent <45 Micron Sodium Bicarbonate Media With 0.981 M HCl.

TABLE 75. SPENT <45 MICRON SODIUM BICARBONATE MEDIA - TITRATION 2.

<u>ml 0.981M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d2(pH)/d(ml)²</u>
0.0	11.499	1.00	-0.40	2.00	0.10
2.0	10.702	3.00	-0.20	4.00	0.03
4.0	10.305	5.00	-0.14	6.00	0.01
6.0	10.030	7.00	-0.12	8.00	0.00
8.0	9.793	9.00	-0.11	10.00	0.00
10.0	9.565	11.00	-0.11	12.00	0.01
12.0	9.345	13.00	-0.09	14.00	-0.07
14.0	9.162	15.00	-0.23	15.63	-0.04
16.0	8.696	16.25	-0.28	16.50	-0.34
16.5	8.557	16.75	-0.45	17.00	-0.43
17.0	8.333	17.25	-0.66	17.50	-0.55
17.5	8.002	17.75	-0.94	18.00	0.68
18.0	7.534	18.25	-0.60	18.50	0.63
18.5	7.236	18.75	-0.28	19.38	0.05
19.0	7.095	20.00	-0.22	21.00	0.04
21.0	6.661	22.00	-0.14	23.00	0.02
23.0	6.379	24.00	-0.10	25.00	0.01
25.0	6.182	26.00	-0.08	27.00	-0.00
27.0	6.023	28.00	-0.08	29.00	-0.01
29.0	5.861	30.00	-0.10	30.75	-0.00
31.0	5.666	31.50	-0.11	31.88	0.04
32.0	5.561	32.25	-0.07	32.50	-0.18
32.5	5.524	32.75	-0.17	33.00	0.37
33.0	5.441	33.25	0.02	33.50	-0.73
33.5	5.450	33.75	-0.35	33.93	-0.25
34.0	5.276	34.10	-0.43	34.20	-0.35
34.2	5.189	34.30	-0.50	34.40	-0.83
34.4	5.088	34.50	-0.67	34.60	-3.12
34.6	4.954	34.70	-1.29	34.80	-2.15
34.8	4.695	34.90	-1.72	35.00	-23.88
35.0	4.350	35.10	-6.50	35.20	22.22
35.2	3.050	35.30	-2.05	35.45	3.94
35.4	2.639	35.60	-0.87	35.75	1.19
35.8	2.290	35.90	-0.51	36.20	0.31
36.0	2.187	36.50	-0.33	37.00	0.17
37.0	1.861	37.50	-0.16	38.00	0.06
38.0	1.704	38.50	-0.09	39.00	0.00
39.0	1.612	39.50	-0.09	29.75	-0.01
40.0	1.523	20.00	0.04	10.00	0.00

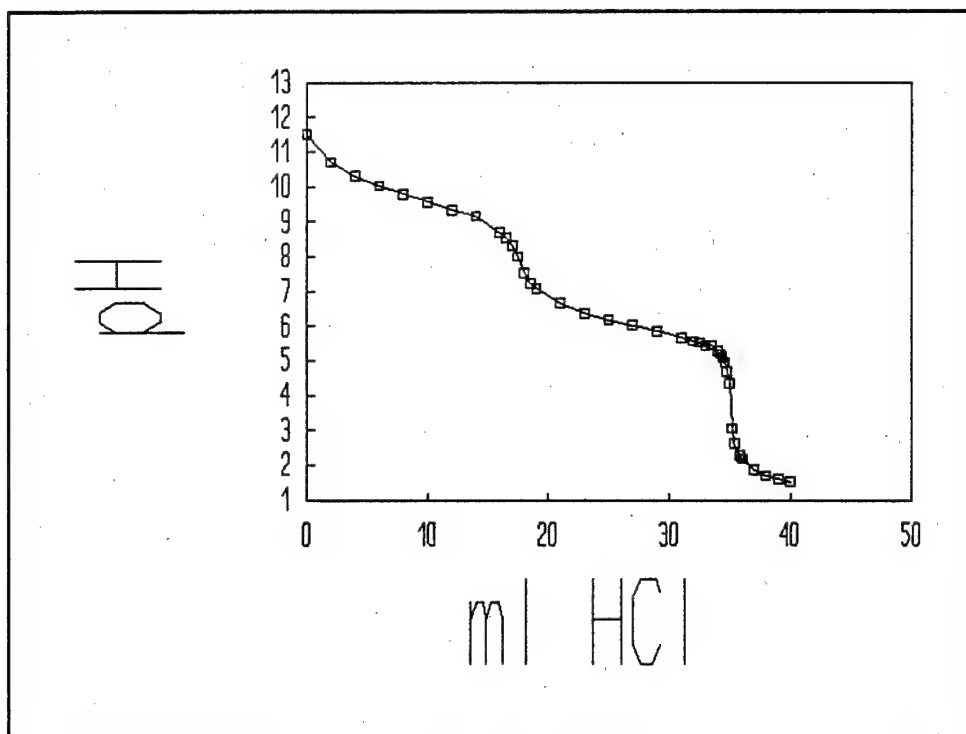


Figure C-226. Curve For The Second Titration Of Spent <45 Micron Sodium Bicarbonate Media With 0.981 M HCl.

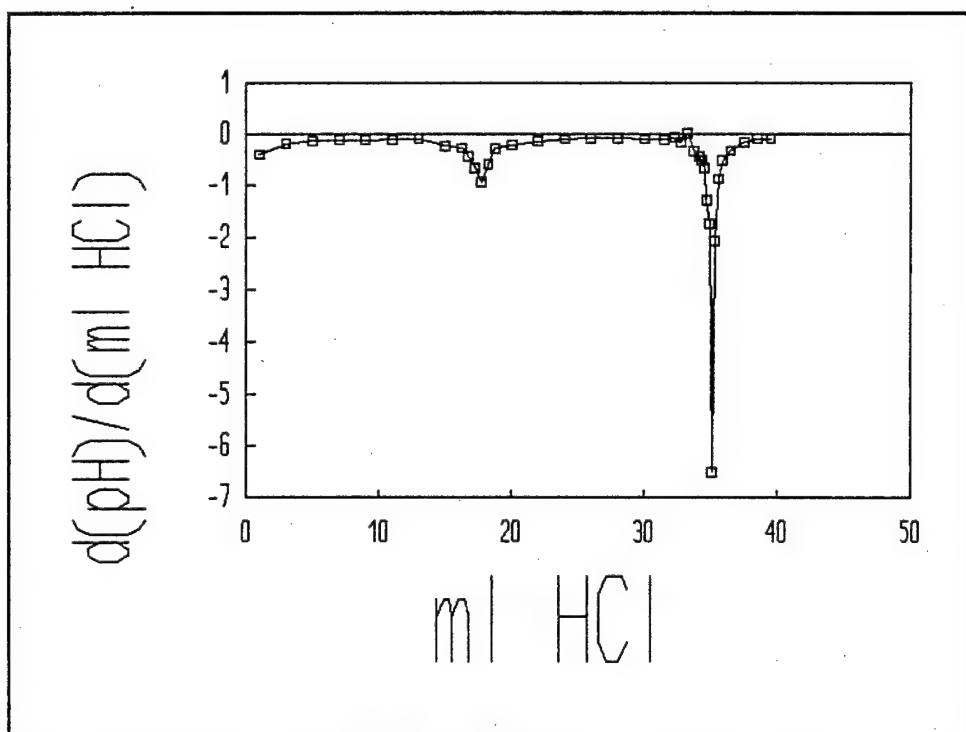


Figure C-227. First Derivative Of The Second Titration Curve For Titration Of Spent <45 Micron Sodium Bicarbonate Media With 0.981 M HCl.

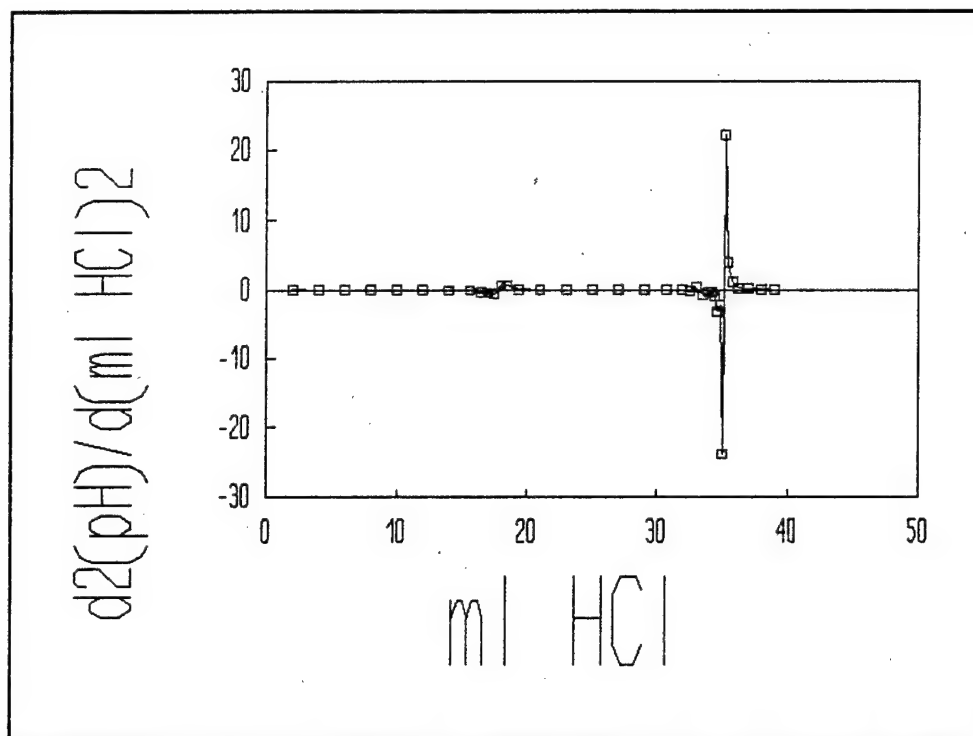


Figure C-228. Second Derivative Of The Second Titration Curve For Titration Of Spent <45 Micron Sodium Bicarbonate Media With 0.981 M HCl.

TABLE 76. SPENT <45 MICRON SODIUM BICARBONATE MEDIA - TITRATION 3.

ml 0.981M HCl	pH	Vol (ml)	d(pH)/d(ml)	Vol (ml)	d ² (pH)/d(ml) ²
0.0	11.492	1.00	-0.41	2.00	0.11
2.0	10.676	3.00	-0.19	4.00	0.03
4.0	10.292	5.00	-0.14	6.00	0.01
6.0	10.019	7.00	-0.11	8.00	0.00
8.0	9.795	9.00	-0.11	10.00	0.00
10.0	9.580	11.00	-0.11	12.00	-0.01
12.0	9.367	13.00	-0.13	14.00	-0.05
14.0	9.098	15.00	-0.23	15.63	0.01
16.0	8.646	16.25	-0.21	16.50	-0.59
16.5	8.540	16.75	-0.51	17.00	-0.62
17.0	8.287	17.25	-0.82	17.50	0.09
17.5	7.879	17.75	-0.77	18.00	0.67
18.0	7.493	18.25	-0.44	18.50	0.02
18.5	7.275	18.75	-0.43	19.38	0.18
19.0	7.062	20.00	-0.21	21.00	0.04
21.0	6.650	22.00	-0.12	23.00	0.01
23.0	6.404	24.00	-0.10	25.00	0.01
25.0	6.197	26.00	-0.09	27.00	0.00
27.0	6.024	28.00	-0.08	28.75	0.00
29.0	5.865	29.50	-0.07	30.00	-0.02
30.0	5.792	30.50	-0.09	31.00	-0.04
31.0	5.699	31.50	-0.13	31.90	-0.01
32.0	5.568	32.30	-0.14	32.55	-0.00
32.6	5.484	32.80	-0.14	33.00	0.17
33.0	5.427	33.20	-0.08	33.40	-0.56
33.4	5.397	33.60	-0.30	33.75	-0.68
33.8	5.277	33.90	-0.50	34.05	0.37
34.0	5.176	34.20	-0.39	34.40	-1.04
34.4	5.019	34.60	-0.81	34.75	-5.74
34.8	4.696	34.90	-2.53	35.03	-10.04
35.0	4.190	35.15	-5.04	35.33	10.61
35.3	2.678	35.50	-1.32	35.68	2.94
35.7	2.148	35.85	-0.30	36.18	0.09
36.0	2.059	36.50	-0.24	37.00	0.10
37.0	1.822	37.50	-0.14	38.00	0.05
38.0	1.686	38.50	-0.09	39.00	0.01
39.0	1.600	39.50	-0.08	29.75	-0.01
40.0	1.523	20.00	0.04	10.00	0.00

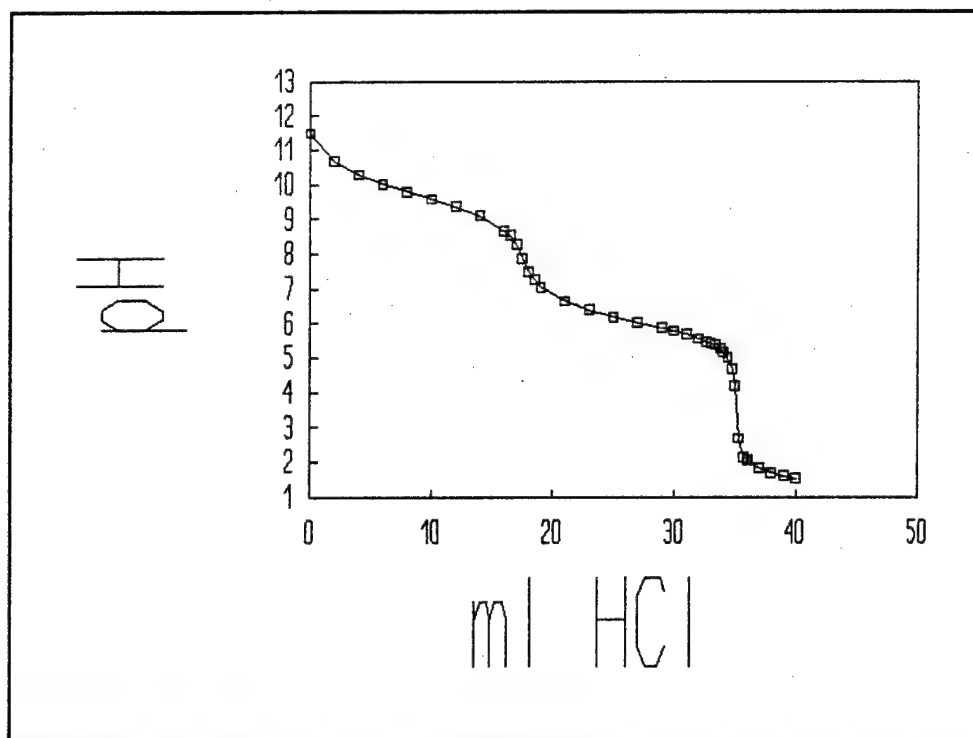


Figure C-229. Curve For The Third Titration Of Spent <45 Micron Sodium Bicarbonate Media With 0.981 M HCl.

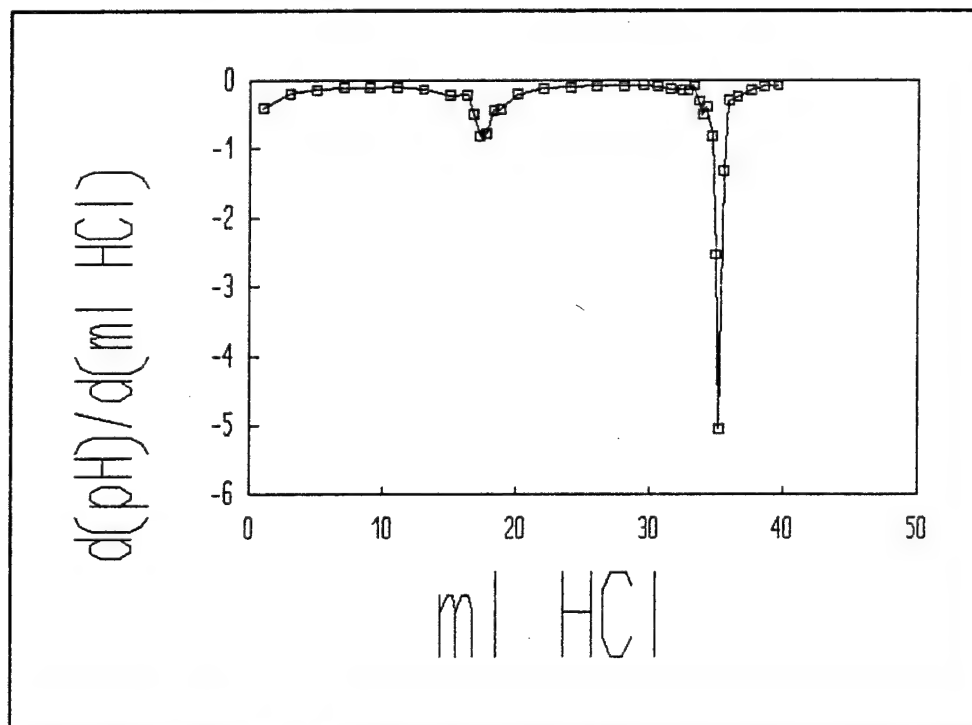


Figure C-230. First Derivative Of The Third Titration Curve For Titration Of Spent <45 Micron Sodium Bicarbonate Media With 0.981 M HCl.

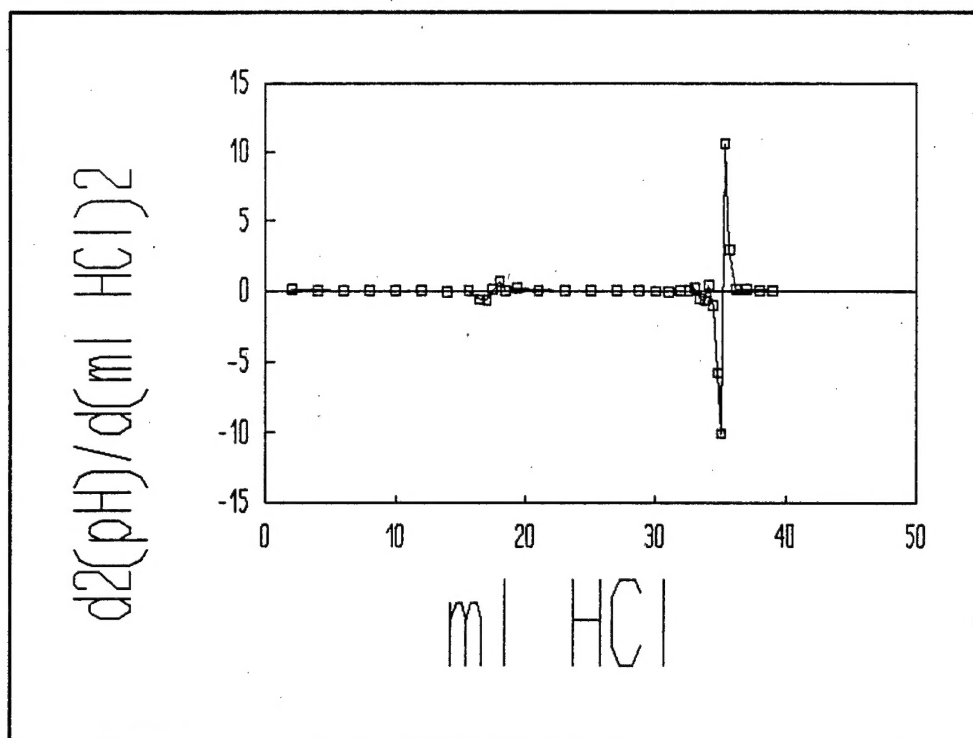


Figure C-231. Second Derivative Of The Third Titration Curve For Titration Of Spent <45 Micron Sodium Bicarbonate Media With 0.981 M HCl.

TABLE 77. SPENT <45 MICRON SODIUM BICARBONATE MEDIA - TITRATION 4.

<u>ml 0.981M HCl</u>	<u>pH</u>	<u>Vol (ml)</u>	<u>d(pH)/d(ml)</u>	<u>Vol (ml)</u>	<u>d²(pH)/d(ml)²</u>
0.0	11.497	1.00	-0.39	2.00	0.10
2.0	10.726	3.00	-0.18	4.00	0.02
4.0	10.367	5.00	-0.15	6.00	0.02
6.0	10.073	7.00	-0.11	8.00	0.00
8.0	9.855	9.00	-0.11	10.00	-0.00
10.0	9.640	11.00	-0.11	12.00	-0.01
12.0	9.413	13.00	-0.13	14.00	-0.02
14.0	9.143	15.00	-0.18	15.75	-0.07
16.0	8.774	16.50	-0.30	16.88	-0.50
17.0	8.478	17.25	-0.67	17.50	-0.24
17.5	8.141	17.75	-0.79	18.00	0.22
18.0	7.745	18.25	-0.68	18.50	0.48
18.5	7.403	18.75	-0.45	19.38	0.17
19.0	7.180	20.00	-0.23	21.00	0.05
21.0	6.715	22.00	-0.13	23.00	0.02
23.0	6.451	24.00	-0.09	25.00	0.00
25.0	6.268	26.00	-0.08	27.00	-0.00
27.0	6.104	28.00	-0.09	29.00	-0.00
29.0	5.930	30.00	-0.09	30.75	0.00
31.0	5.741	31.50	-0.09	32.00	-0.06
32.0	5.651	32.50	-0.15	32.88	0.07
33.0	5.503	33.25	-0.09	33.50	-0.20
33.5	5.457	33.75	-0.19	33.95	0.23
34.0	5.360	34.15	-0.10	34.30	-0.62
34.3	5.329	34.45	-0.29	34.63	-0.66
34.6	5.242	34.80	-0.52	34.95	-0.57
35.0	5.034	35.10	-0.69	35.20	-1.17
35.2	4.896	35.30	-0.92	35.40	-8.43
35.4	4.711	35.50	-2.61	35.60	-16.35
35.6	4.189	35.70	-5.88	35.80	18.17
35.8	3.013	35.90	-2.24	36.20	2.70
36.0	2.564	36.50	-0.62	37.00	0.48
37.0	1.940	37.50	-0.15	38.00	0.03
38.0	1.794	38.50	-0.12	39.00	0.02
39.0	1.675	39.50	-0.10	29.75	-0.01
40.0	1.575	20.00	0.04	10.00	0.00

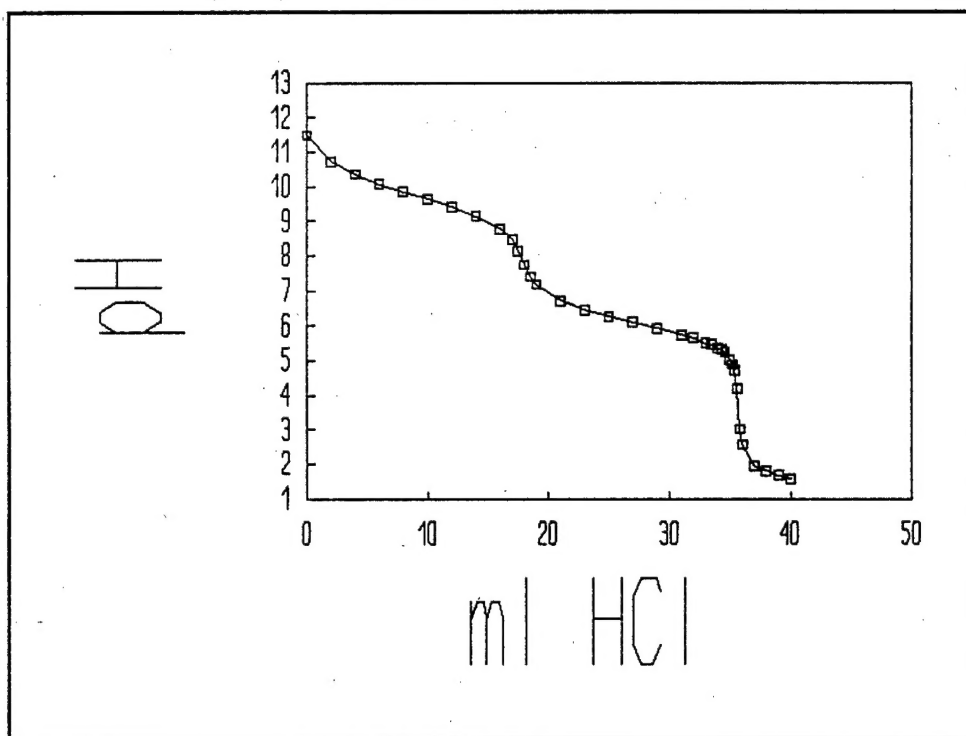


Figure C-232. Curve For The Fourth Titration Of Spent <45 Micron Sodium Bicarbonate Media With 0.981 M HCl.

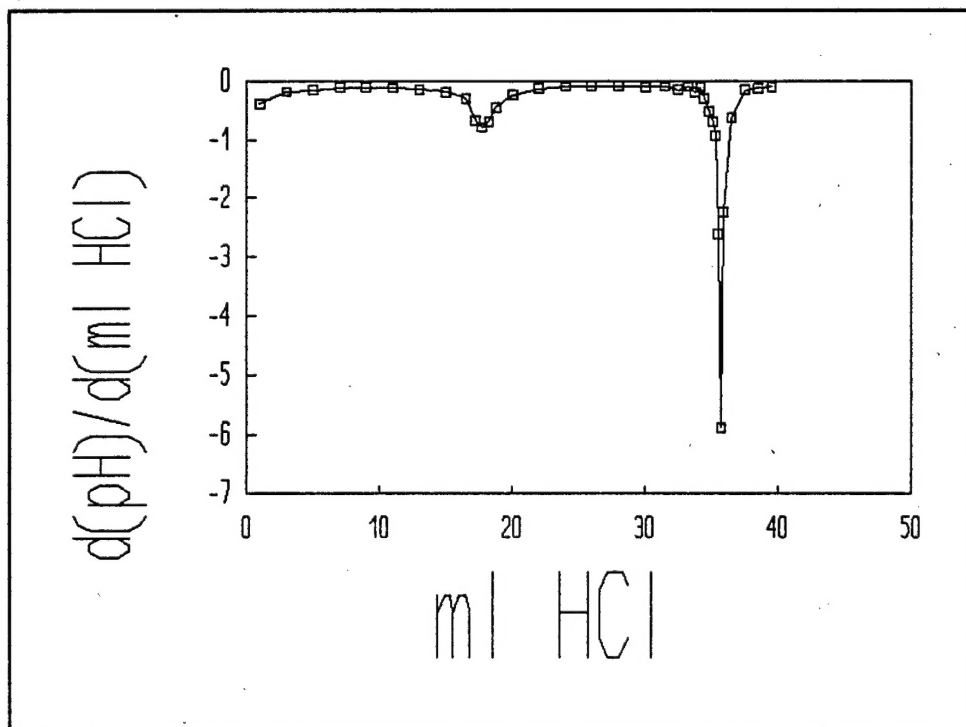


Figure C-233. First Derivative Of The Fourth Titration Curve For Titration Of Spent <45 Micron Sodium Bicarbonate Media With 0.981 M HCl.

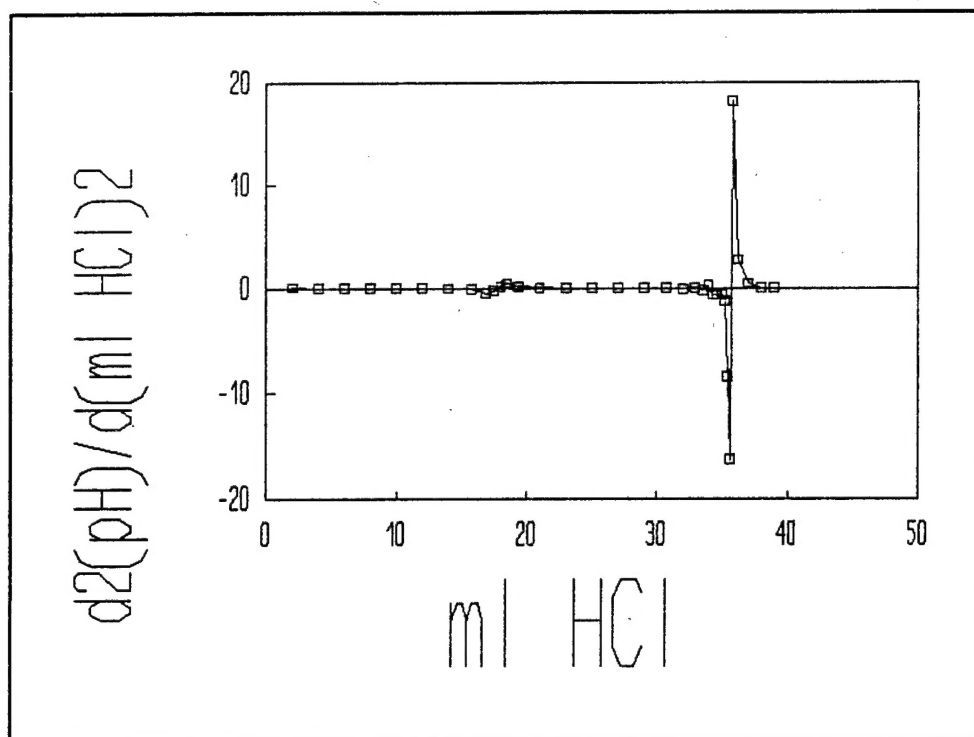


Figure C-234. Second Derivative Of The Fourth Titration Curve For Titration Of Spent <45 Micron Sodium Bicarbonate Media With 0.981 M HCl.